

LSG 770-430

ORIENTATION
STUDY GUIDE
LUNAR MODULE

CONTRACT NAS 9-1100

EXHIBIT E; PARAGRAPH 3.7.4

TYPE III DOCUMENT

FOR TRAINING PURPOSES ONLY; IN
SUPPORT OF LM SUBSYSTEM BRIEFINGS

REFERENCE CF22/T37-67-T482

LM TRAINING SECTION
PRODUCT SUPPORT DEPARTMENT
GRUMMAN AIRCRAFT ENGINEERING CORPORATION
BETHPAGE, NEW YORK

NOVEMBER 1967

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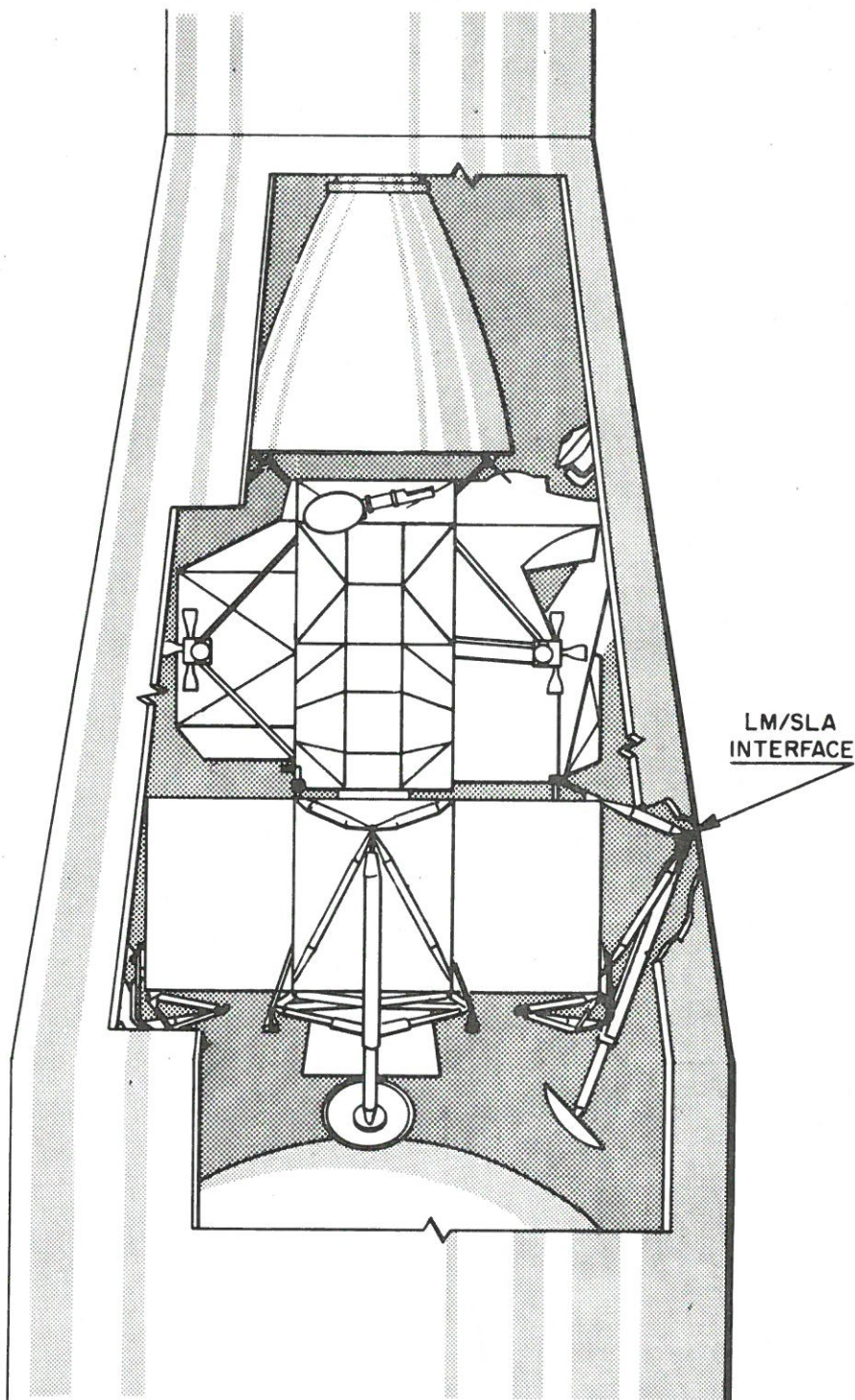
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Date: November 1967

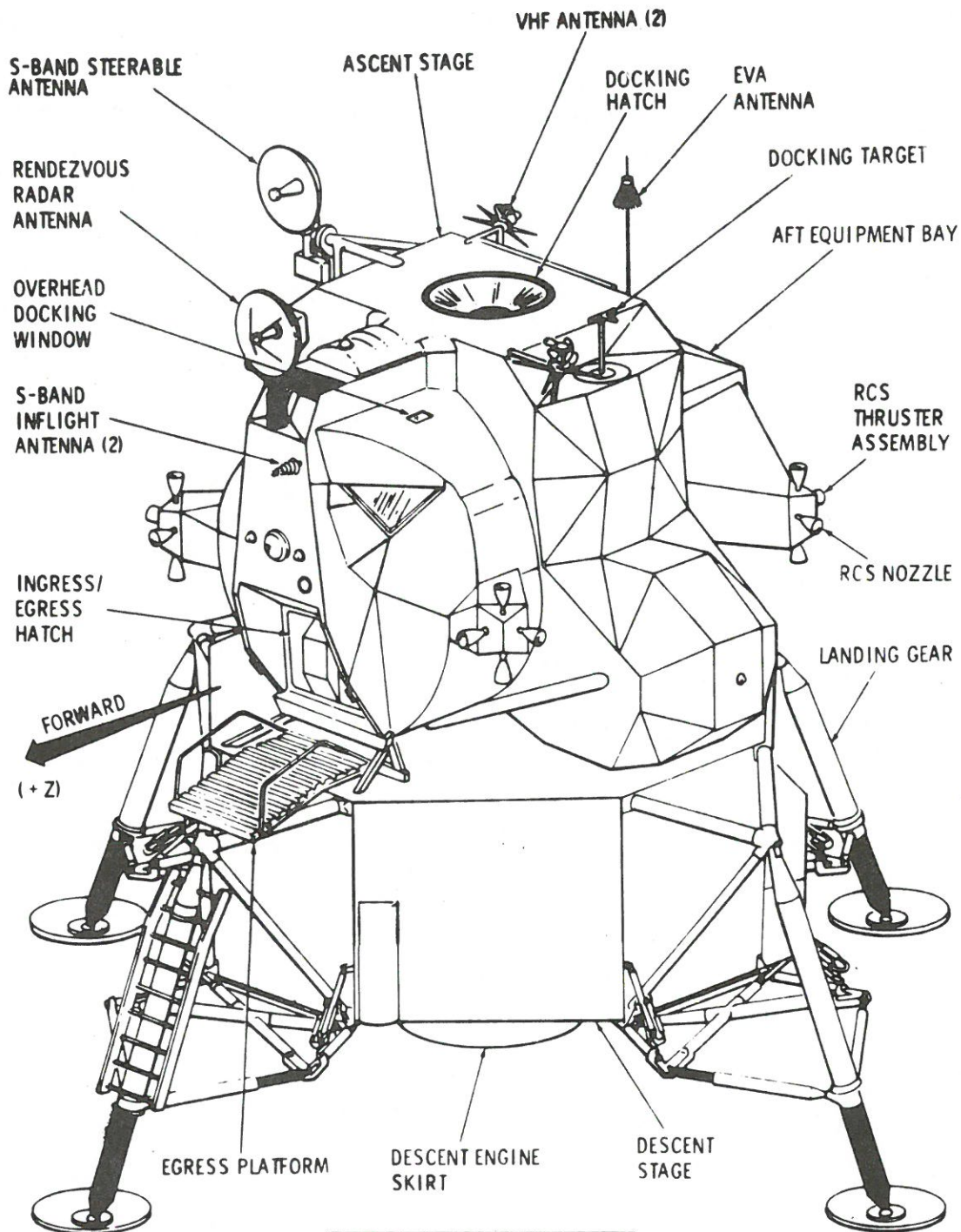
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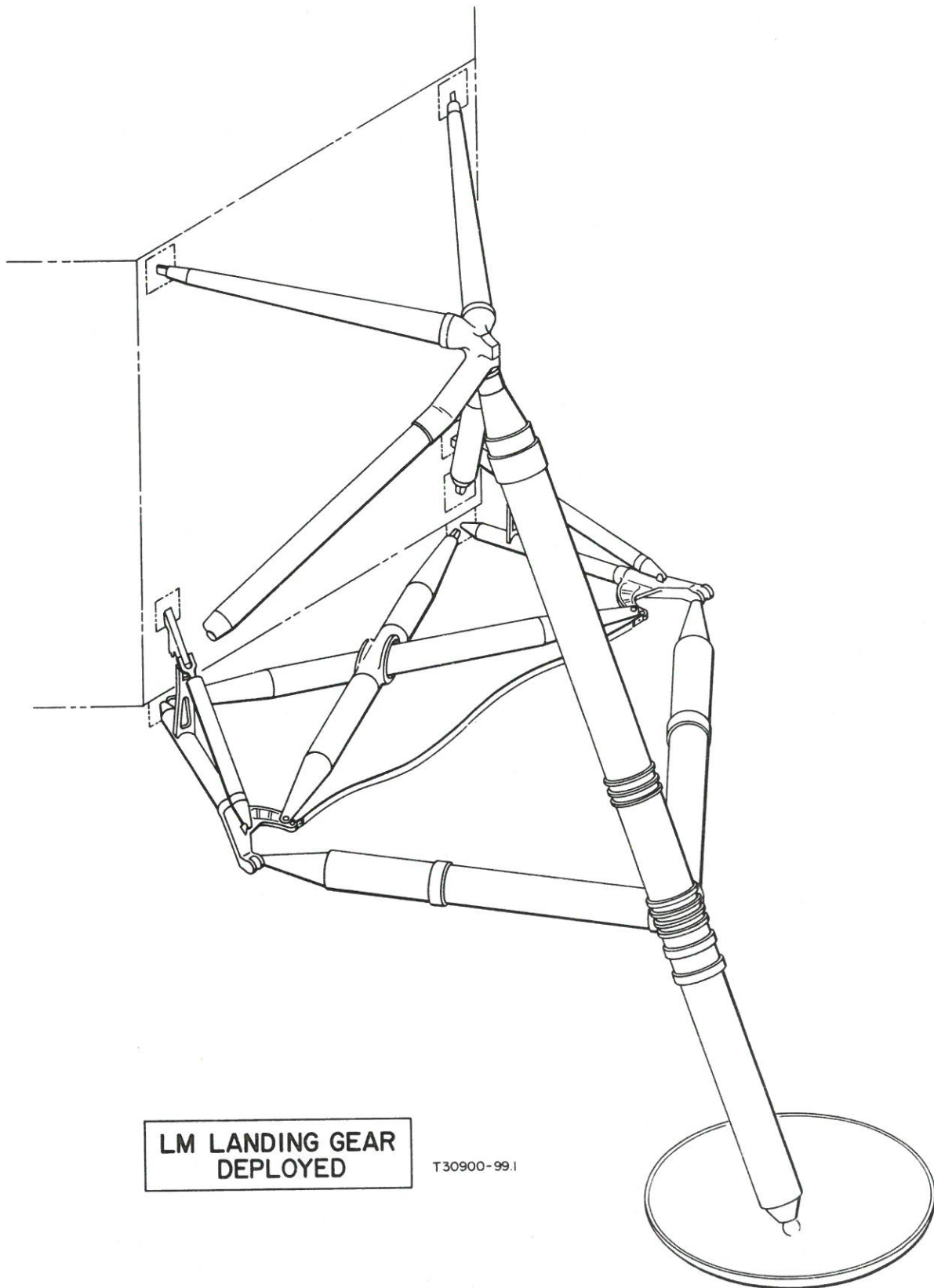
LM SLB BOOSTER INTERFACE

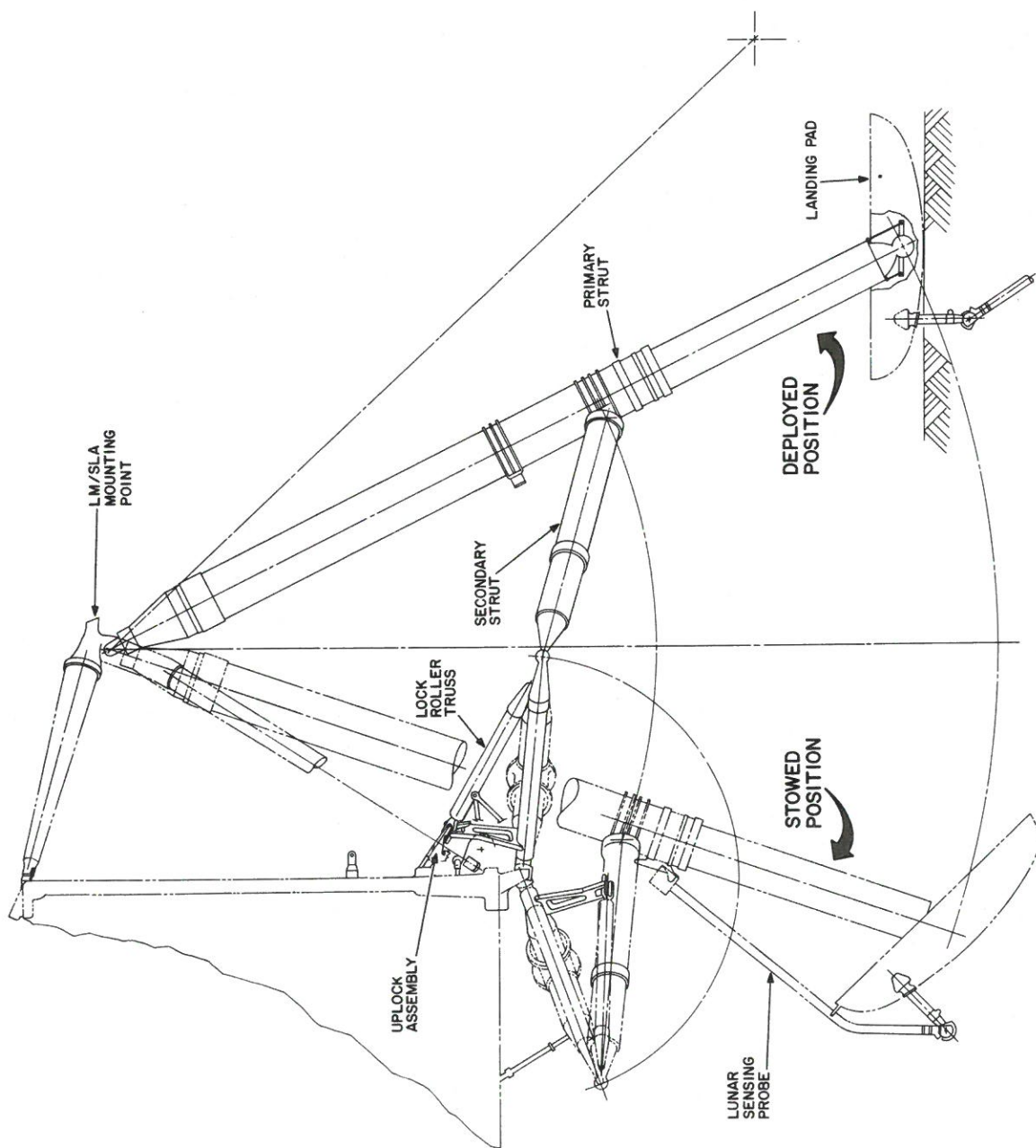
T30005-14.1



LM VEHICLE

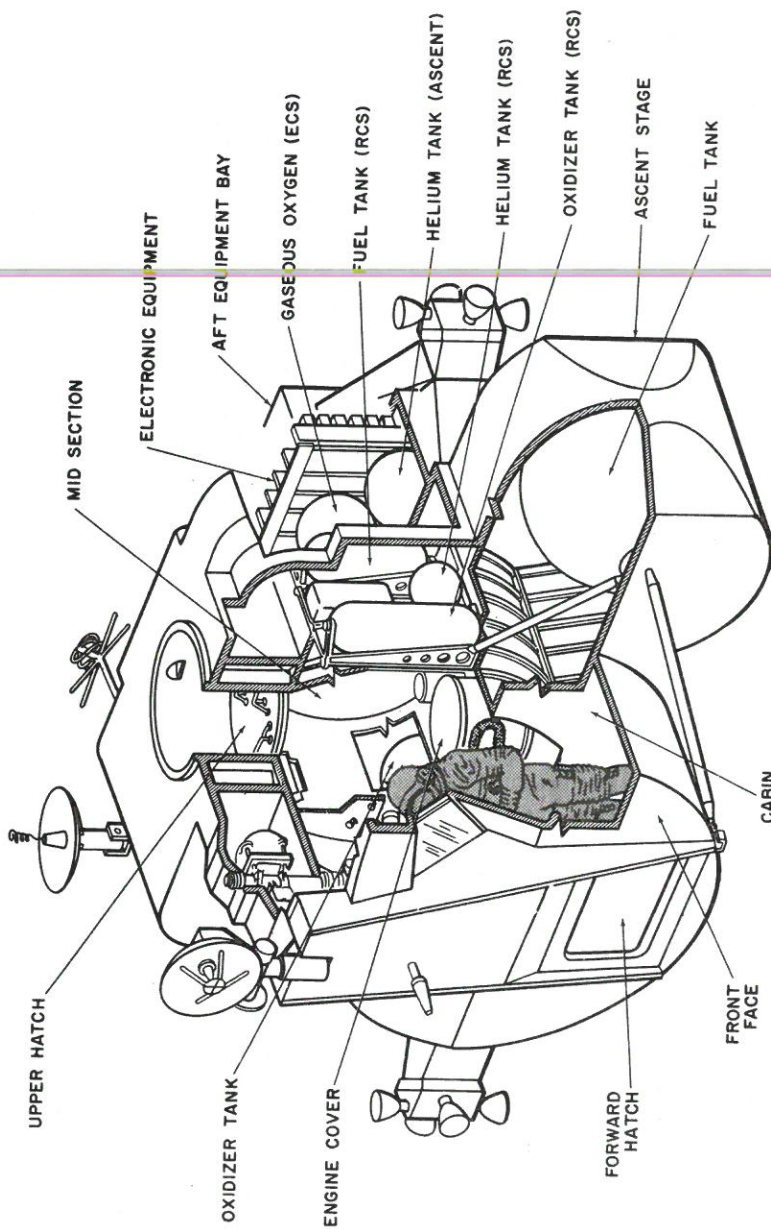
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LM LANDING GEAR

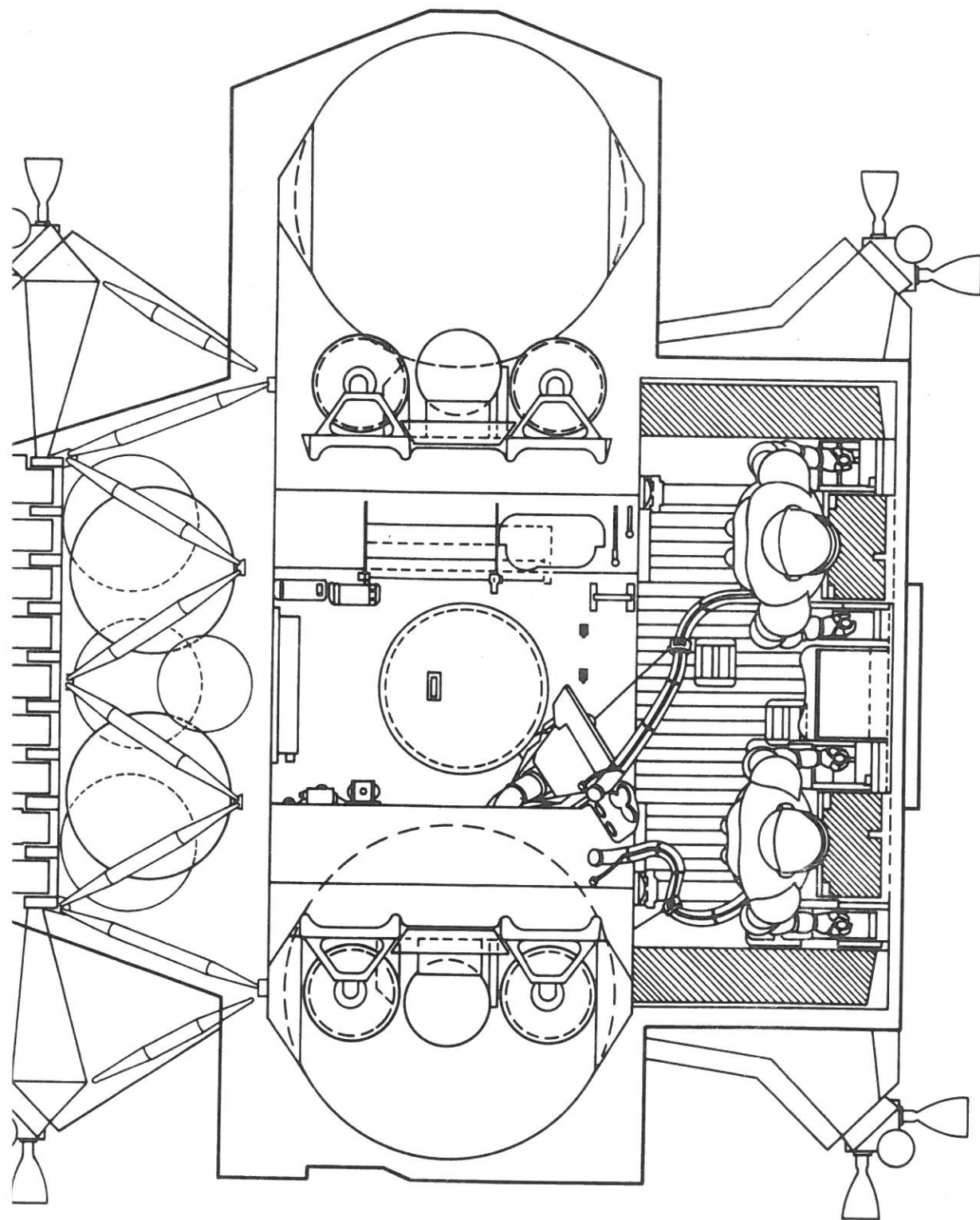
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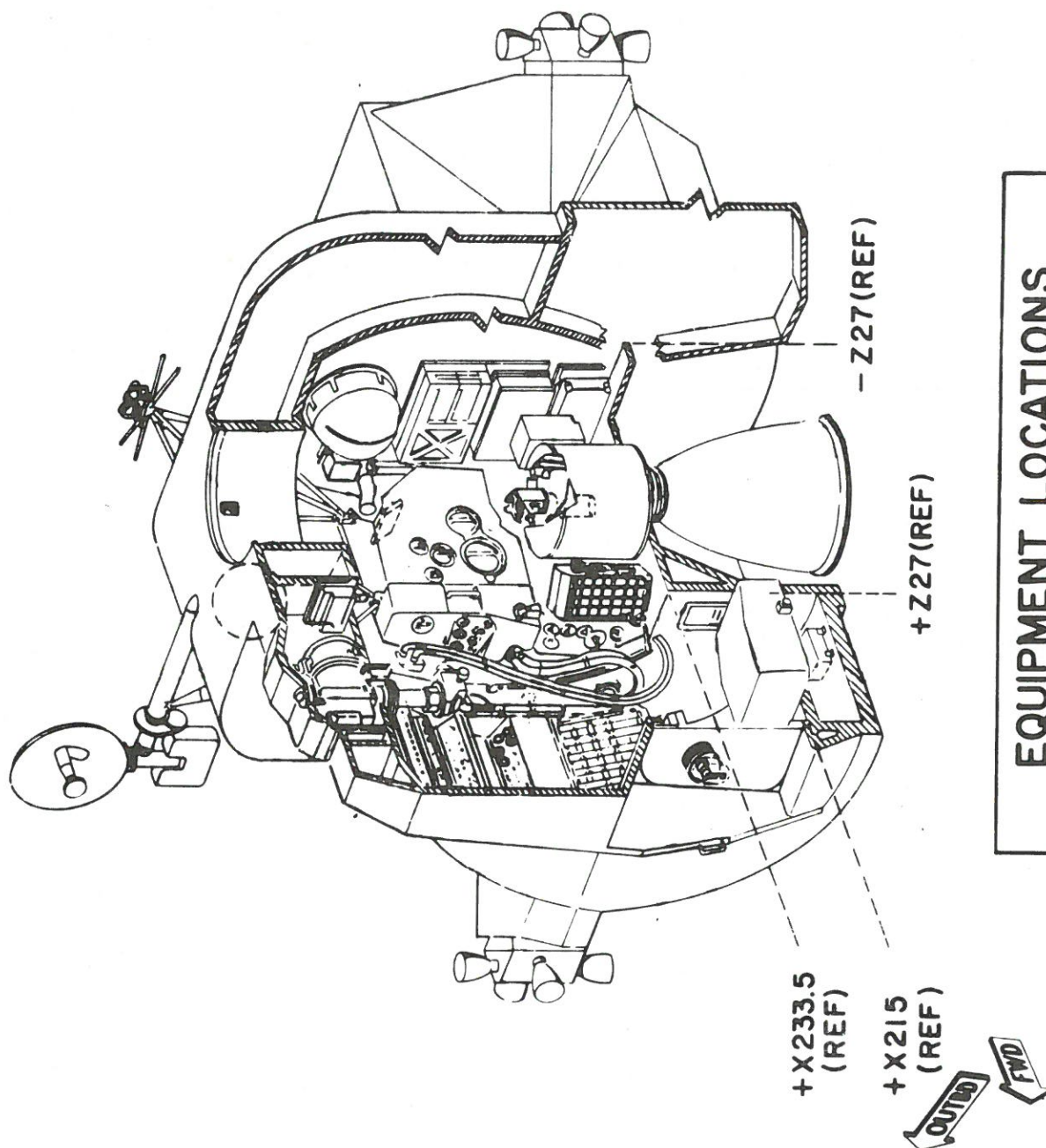


ASCENT STAGE

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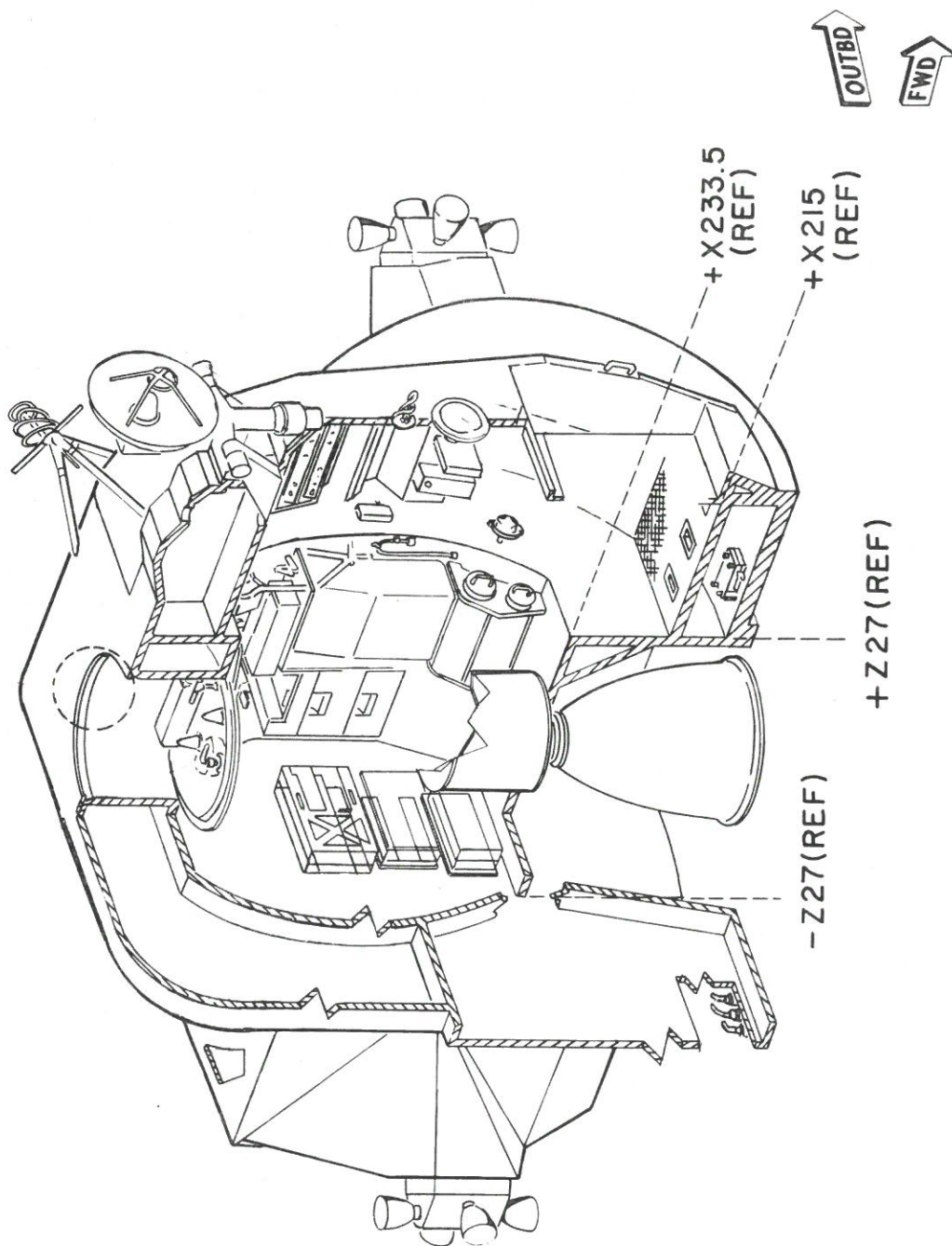
ASCENT STAGE PLAN VIEW





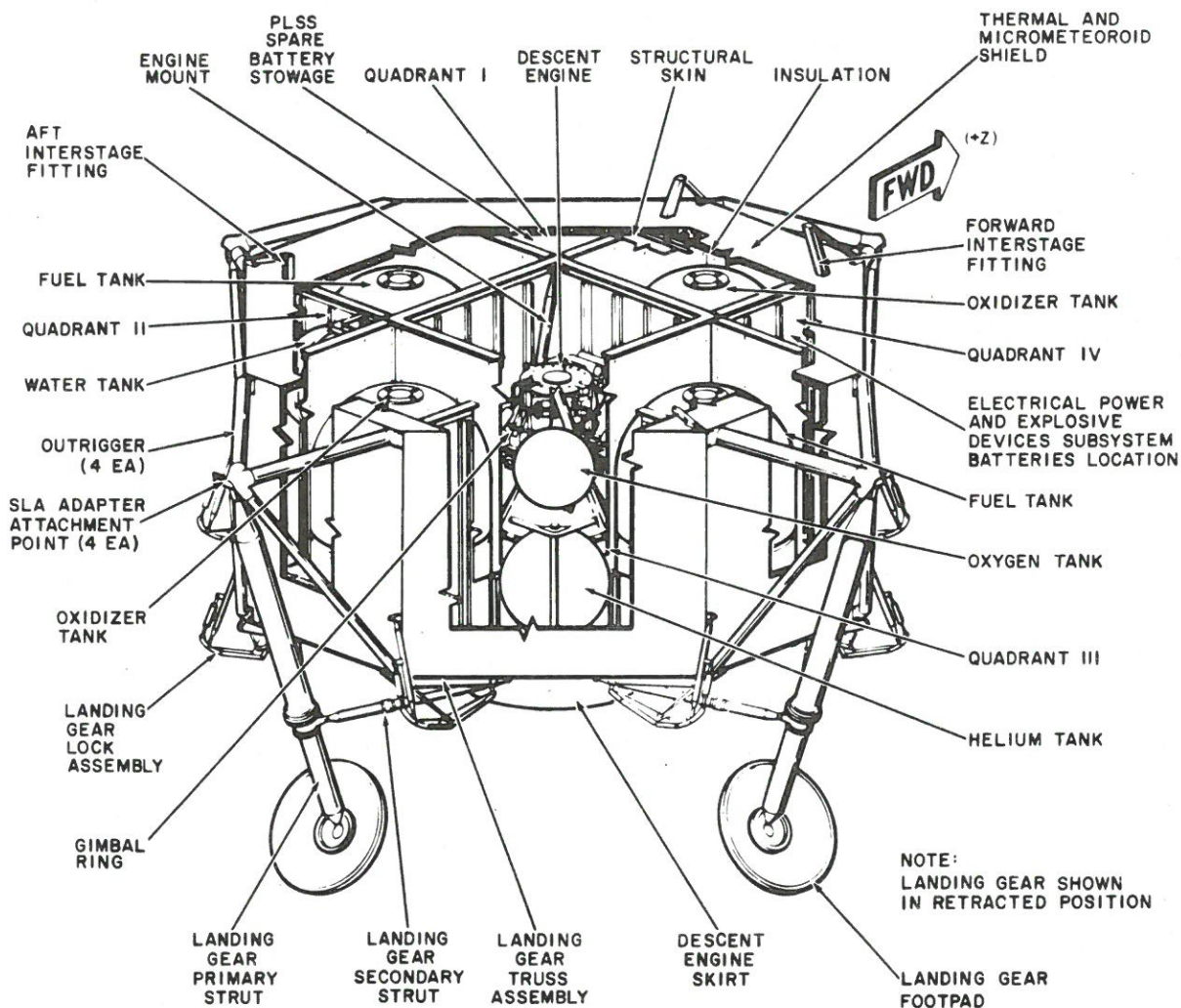
**EQUIPMENT LOCATIONS
ASCENT STAGE-R/H SIDE**

Date: November 1967



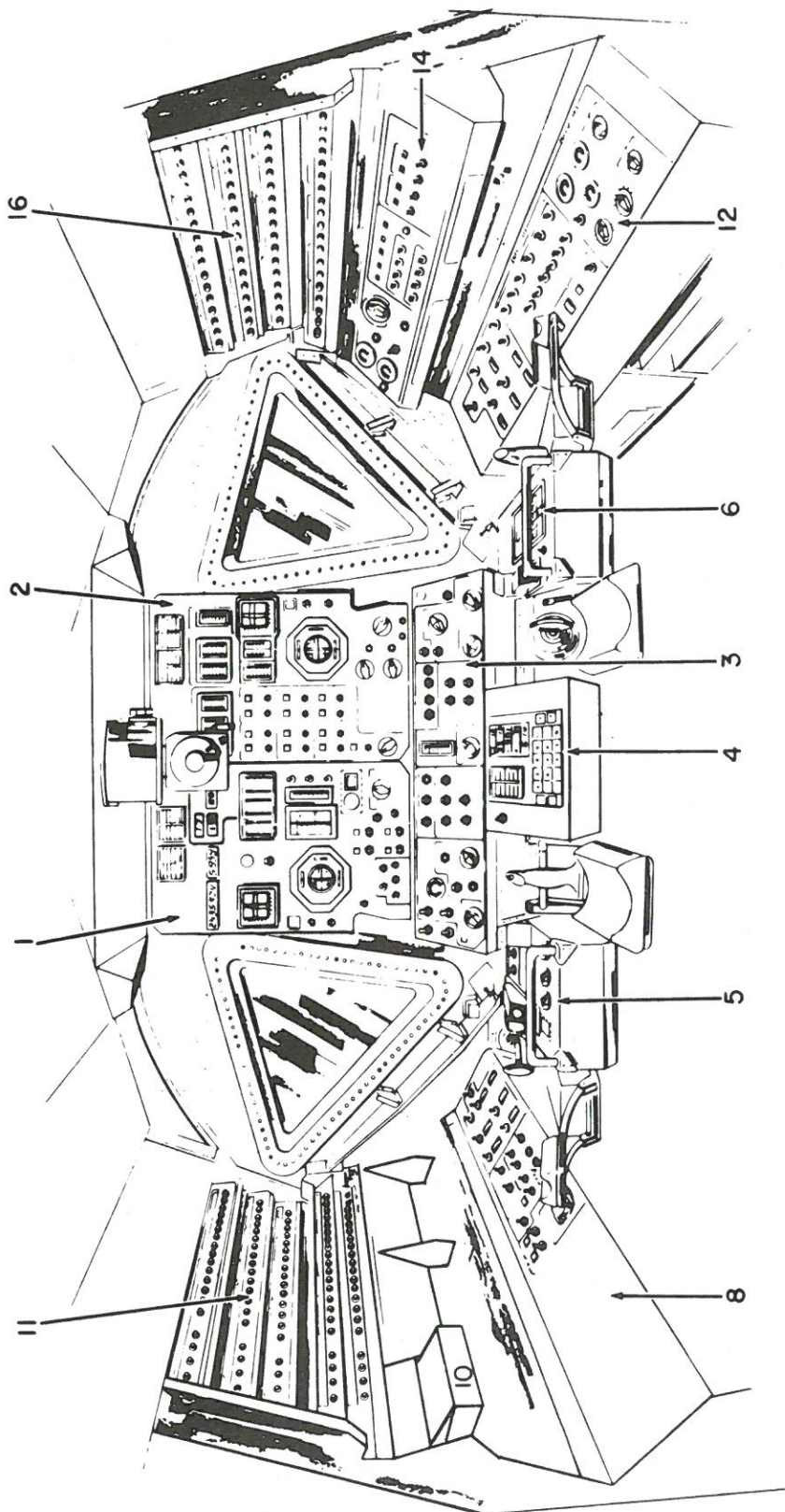
EQUIPMENT LOCATIONS ASCENT STAGE-L/H SIDE

T30005-31.1



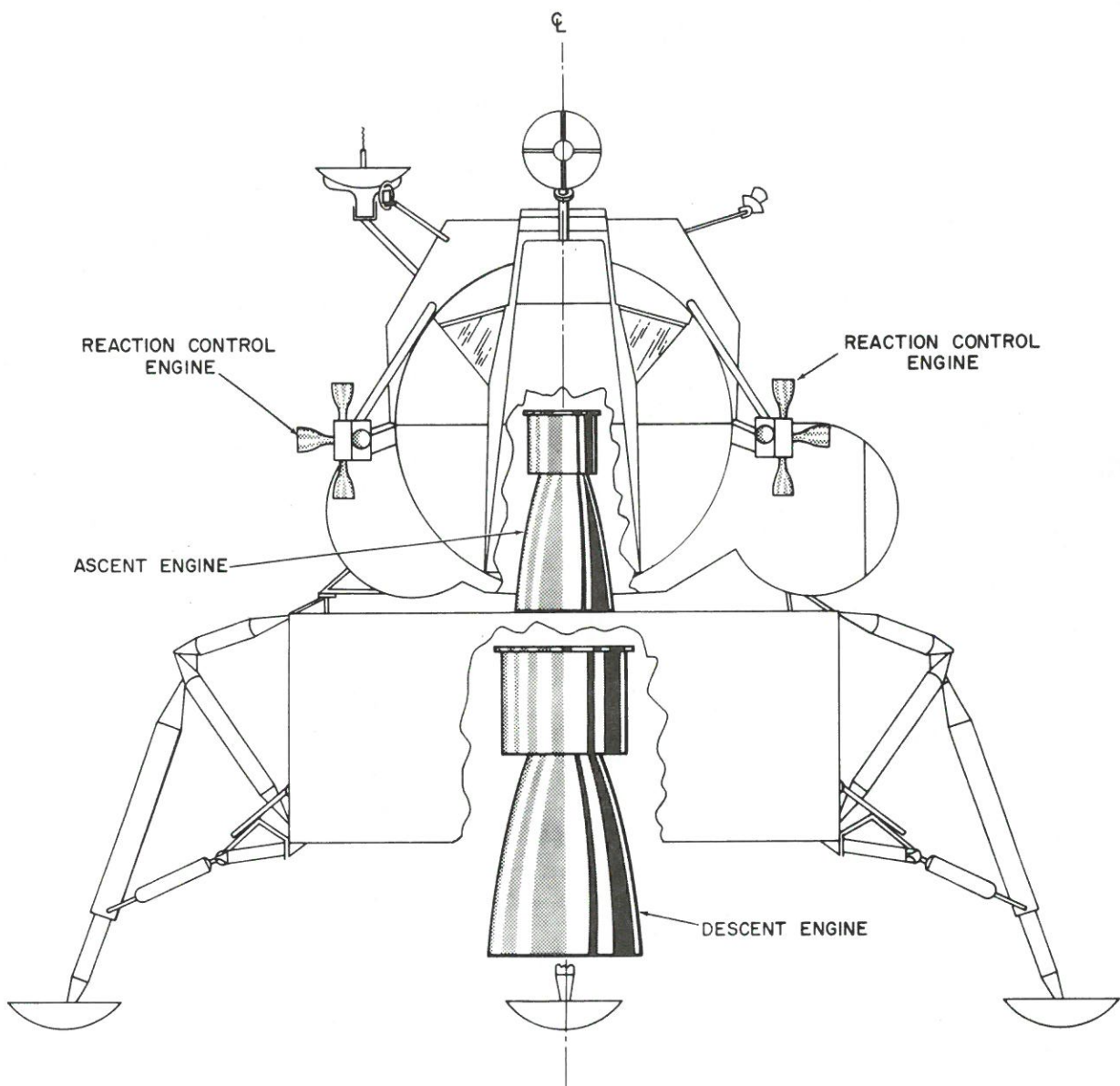
LM DESCENT STAGE

T30915-42.1



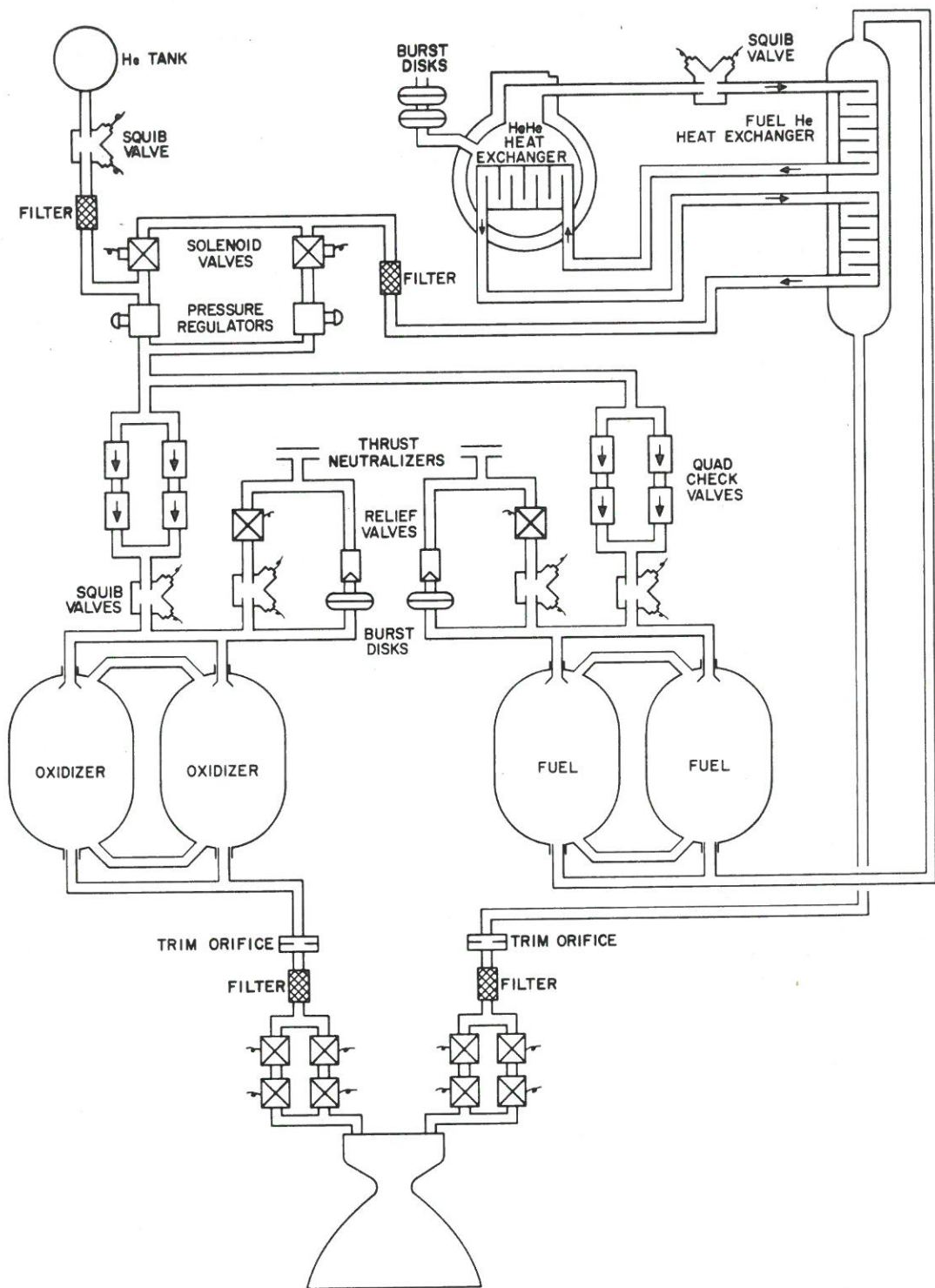
LM DISPLAYS AND CONTROLS

T30900 - 150.1



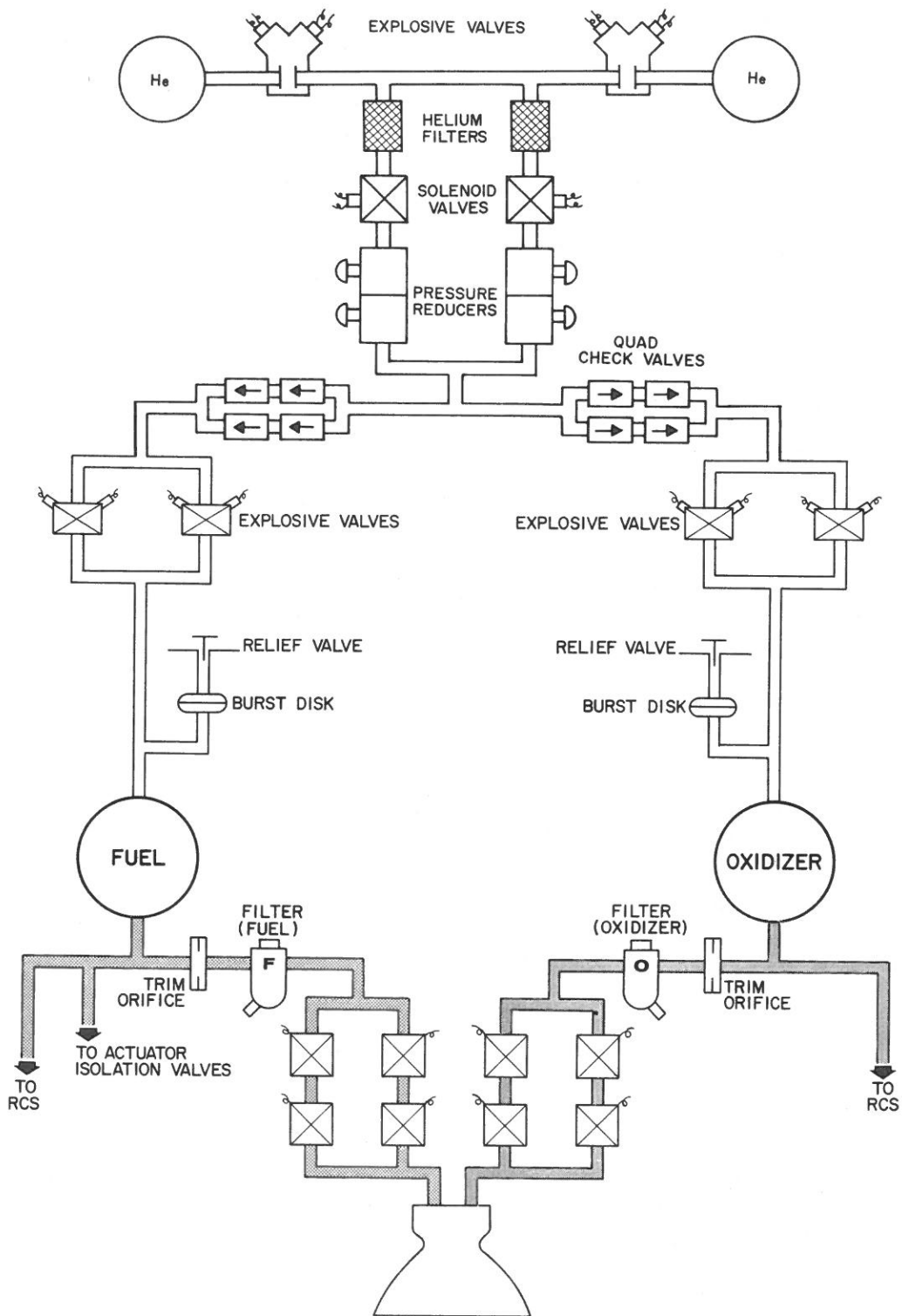
LM ENGINE LOCATIONS

T30207-18.1



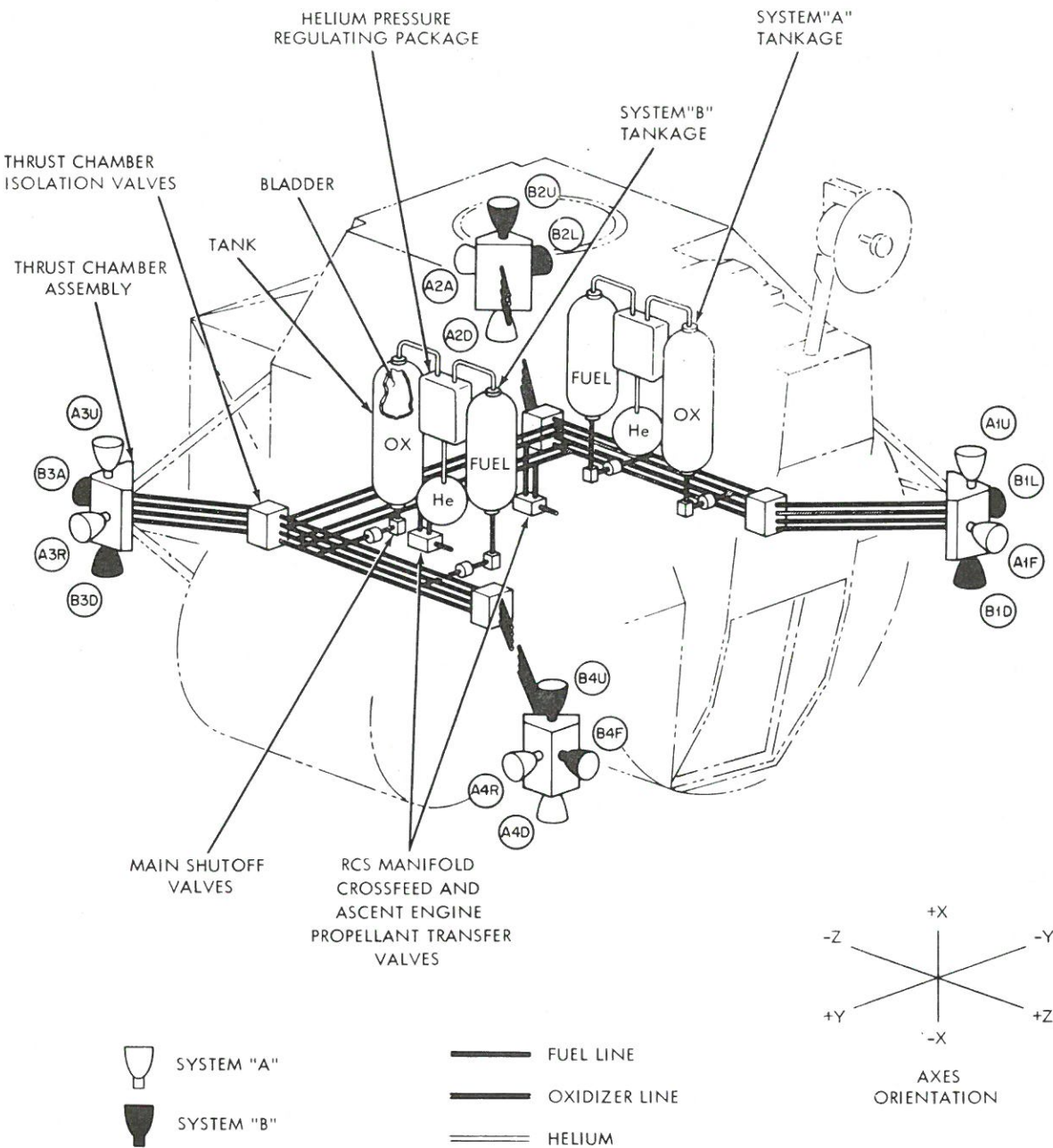
**DESCENT PROPULSION
SCHEMATIC**

T 30005-154.1



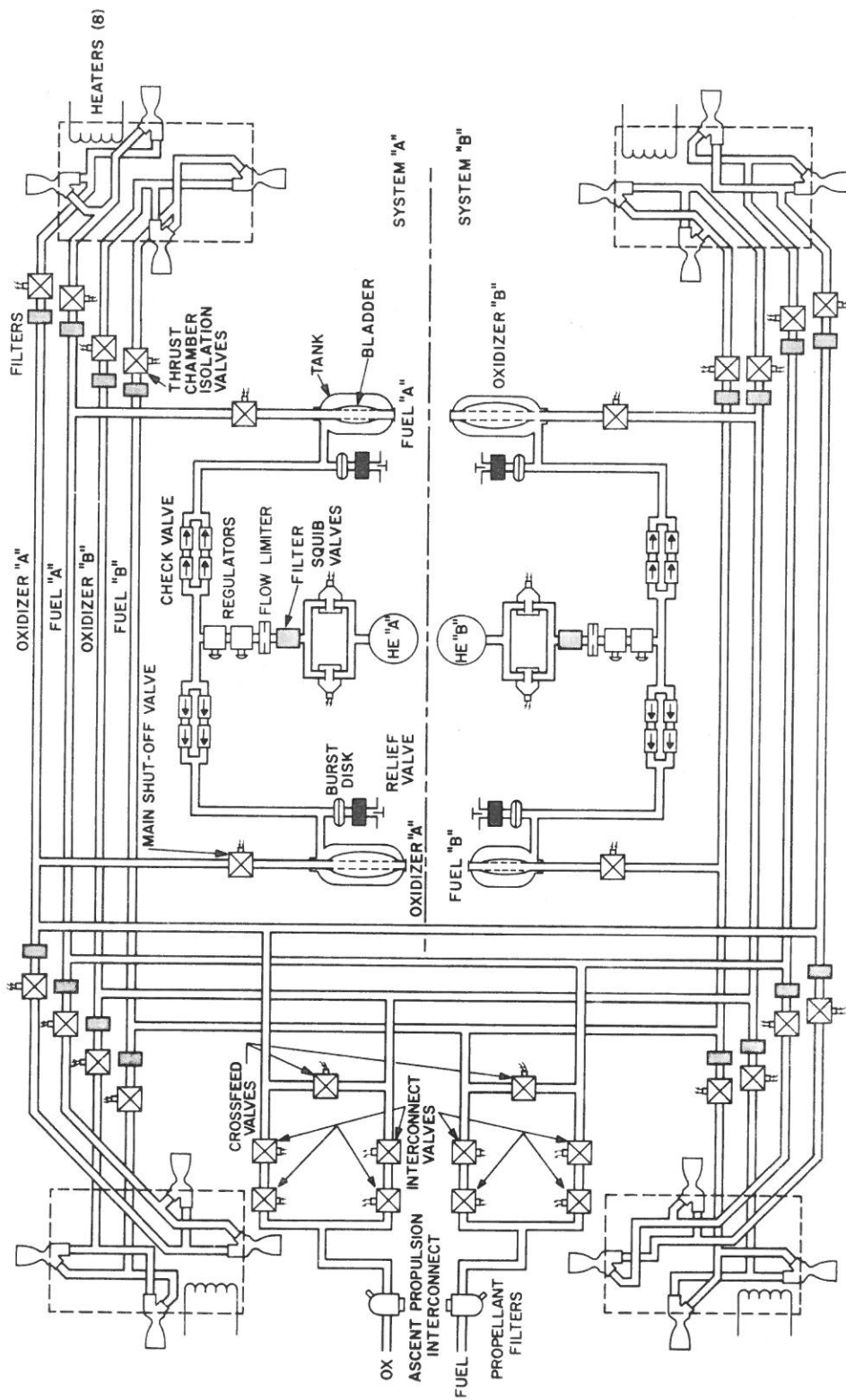
ASCENT PROPELLANT SYSTEM

T30207-46.1



RCS INSTALLATION

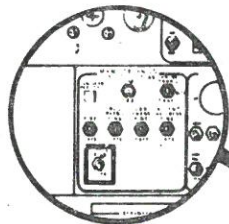
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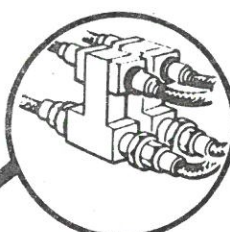
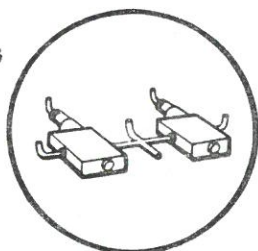
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RCS PROPELLANT SYSTEM

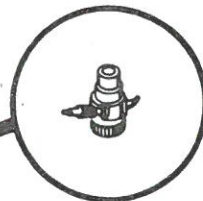
**RCS SYSTEM
HELIUM PRESSURIZING
VALVES**



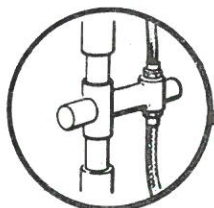
**ED CONTROL
PANEL**



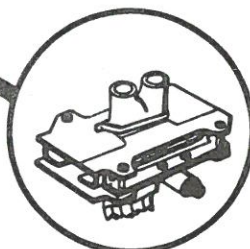
**ASCENT PROPULSION SYSTEM
HELIUM PRESSURIZING
VALVE**



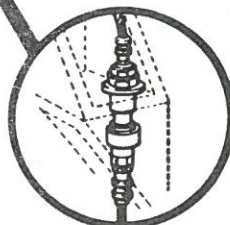
**THREE DEADFACE
CONNECTORS
(CIRCUIT INTERRUPTER)**



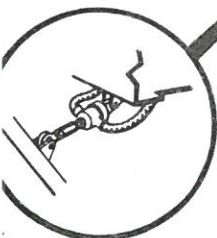
**ASCENT PROPULSION SYSTEM
HELIUM PRESSURIZING
VALVE**



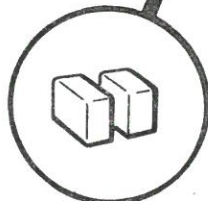
**INTERSTAGE
UMBILICAL
CUTTERS**



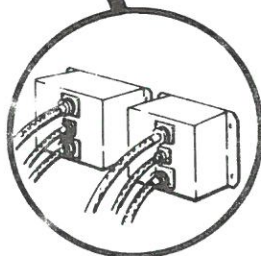
**INTERSTAGE
STRUCTURAL
CONNECTION**



**LANDING GEAR
UPLOCK**



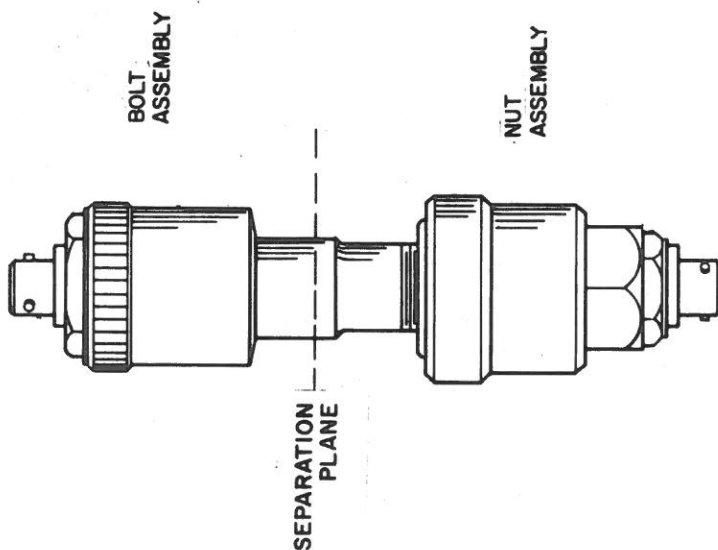
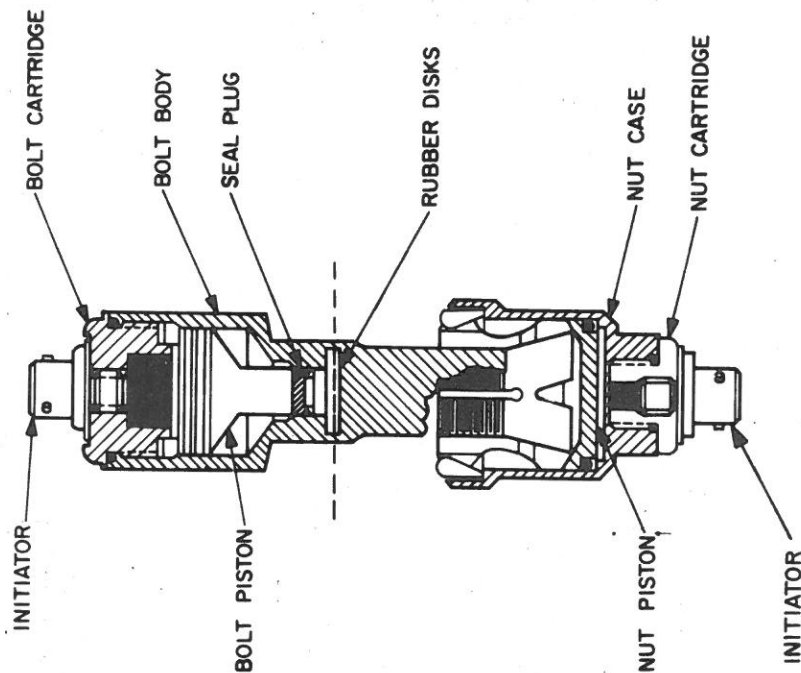
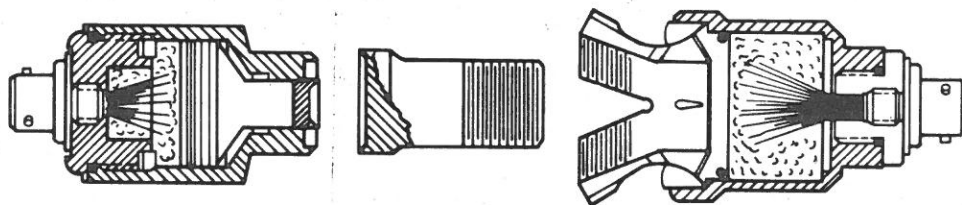
**TWO ED BATTERIES
DESCENT STAGE**



**TWO ED RELAY BOXES
DESCENT STAGE**

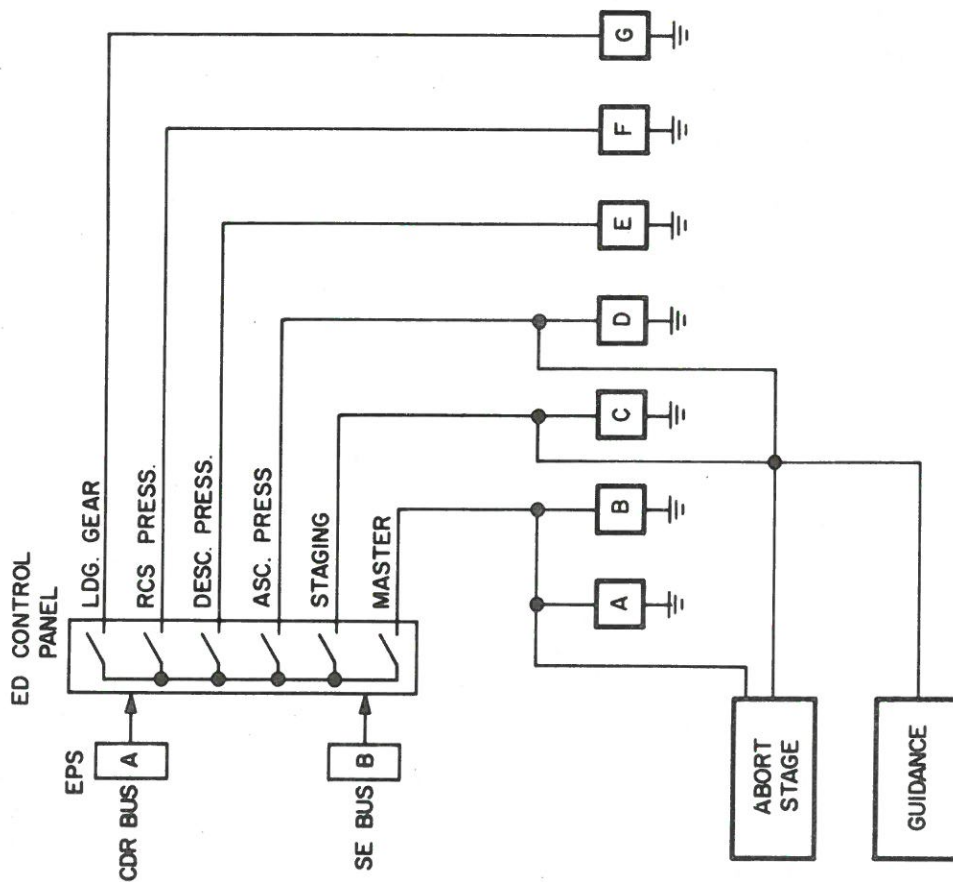
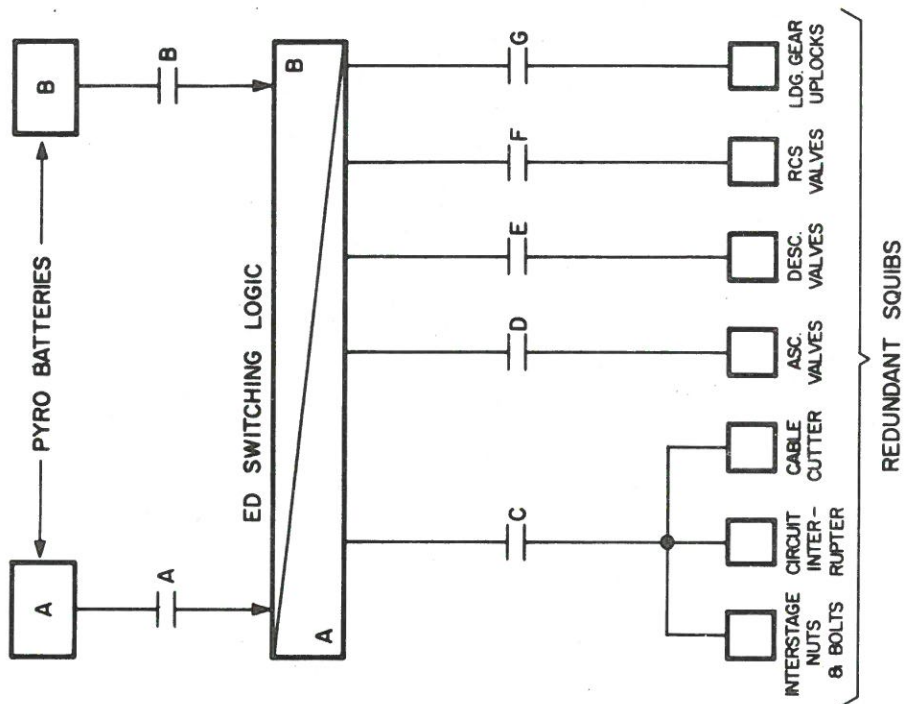
EXPLOSIVE DEVICES COMPONENT LOCATIONS

T30905-13.1



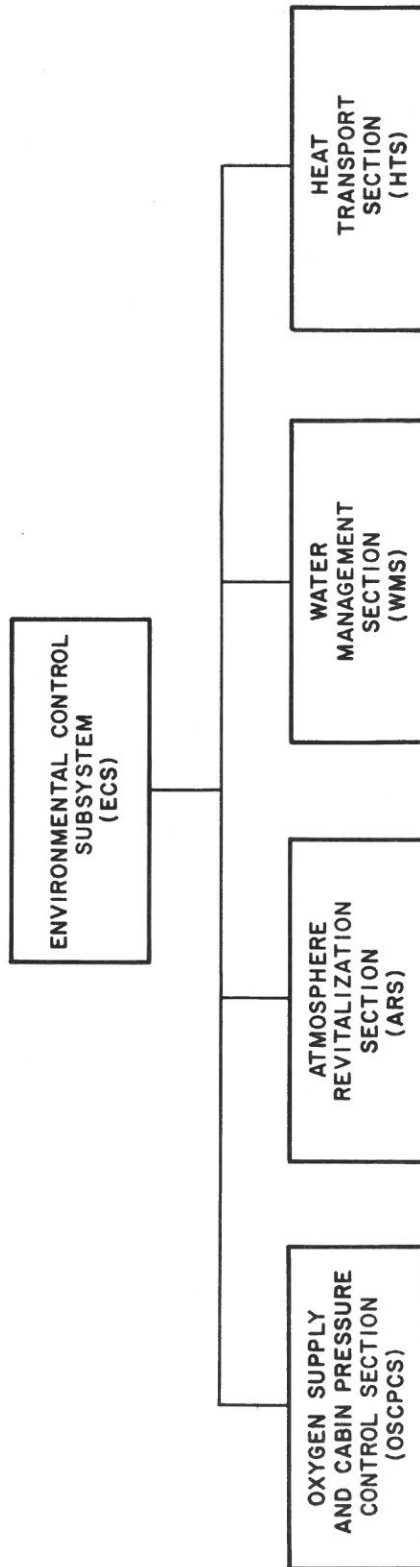
INTERSTAGE STRUCTURAL CONNECTION NUT AND BOLT ASSEMBLY

T30905-58.1



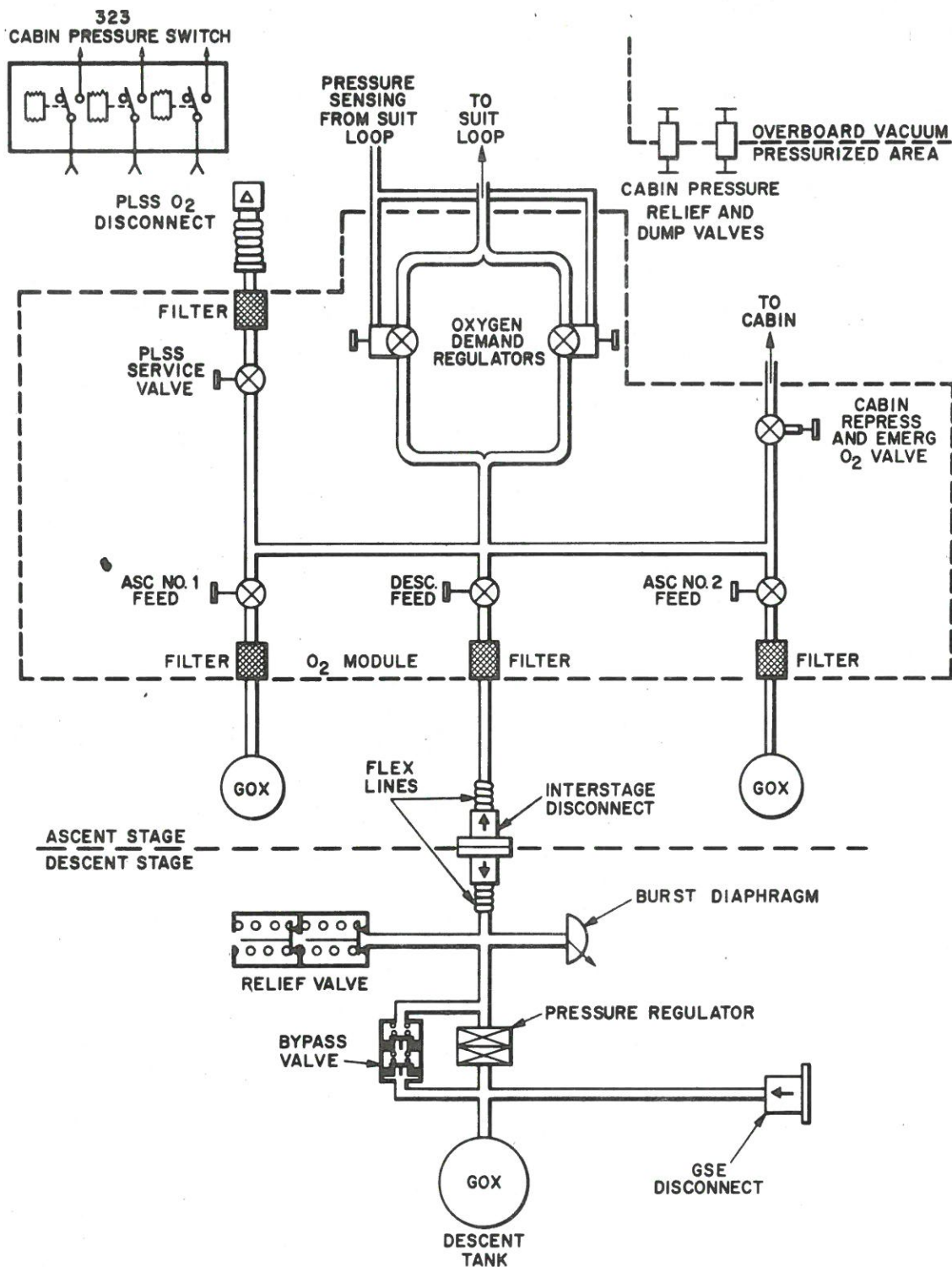
ELECTRO EXPLOSIVE DEVICES
BLOCK DIAGRAM (SIMPLIFIED)

T30207-166.1



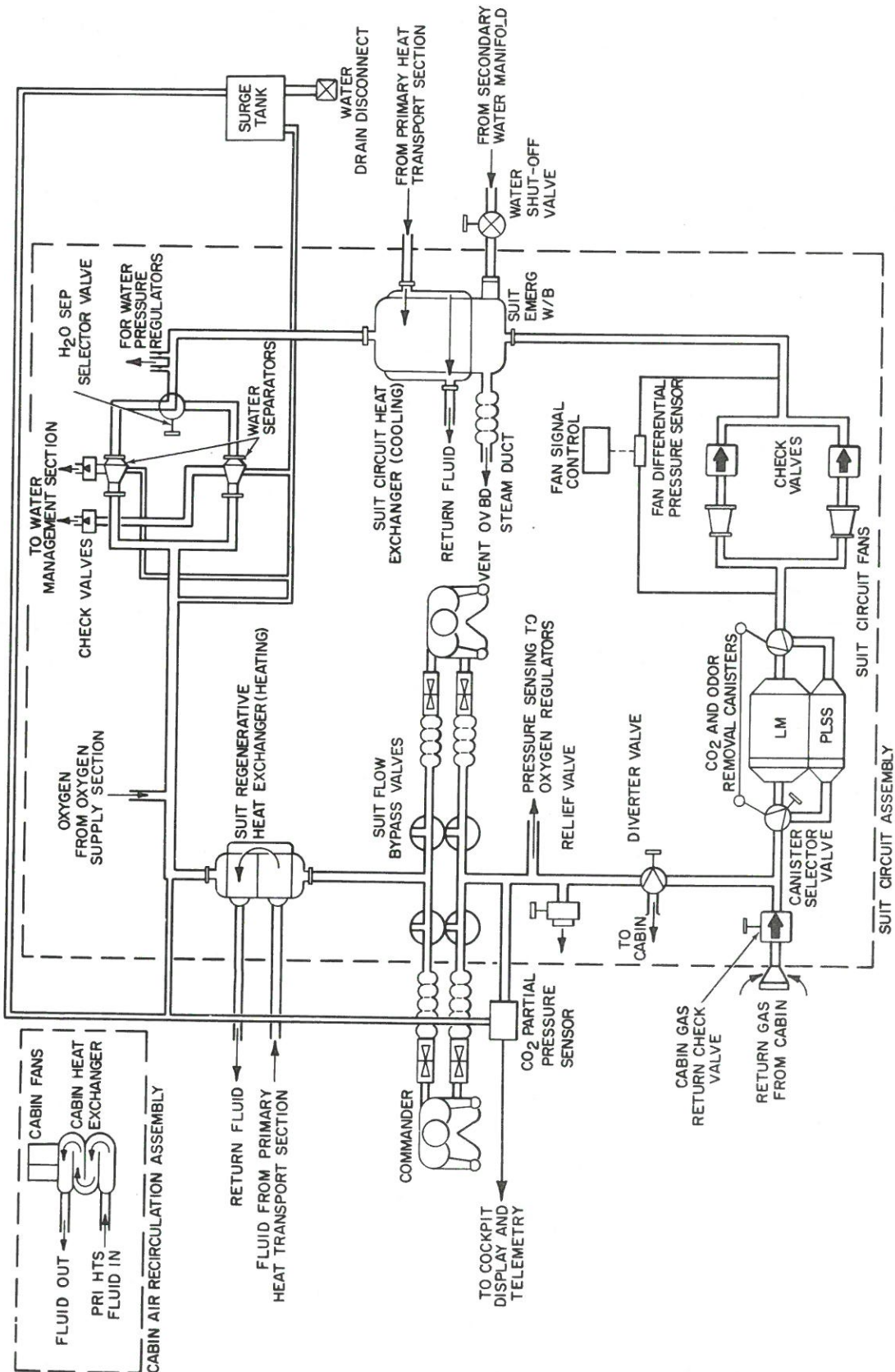
LM ECS BASIC BLOCK DIAGRAM

T30005-61.1



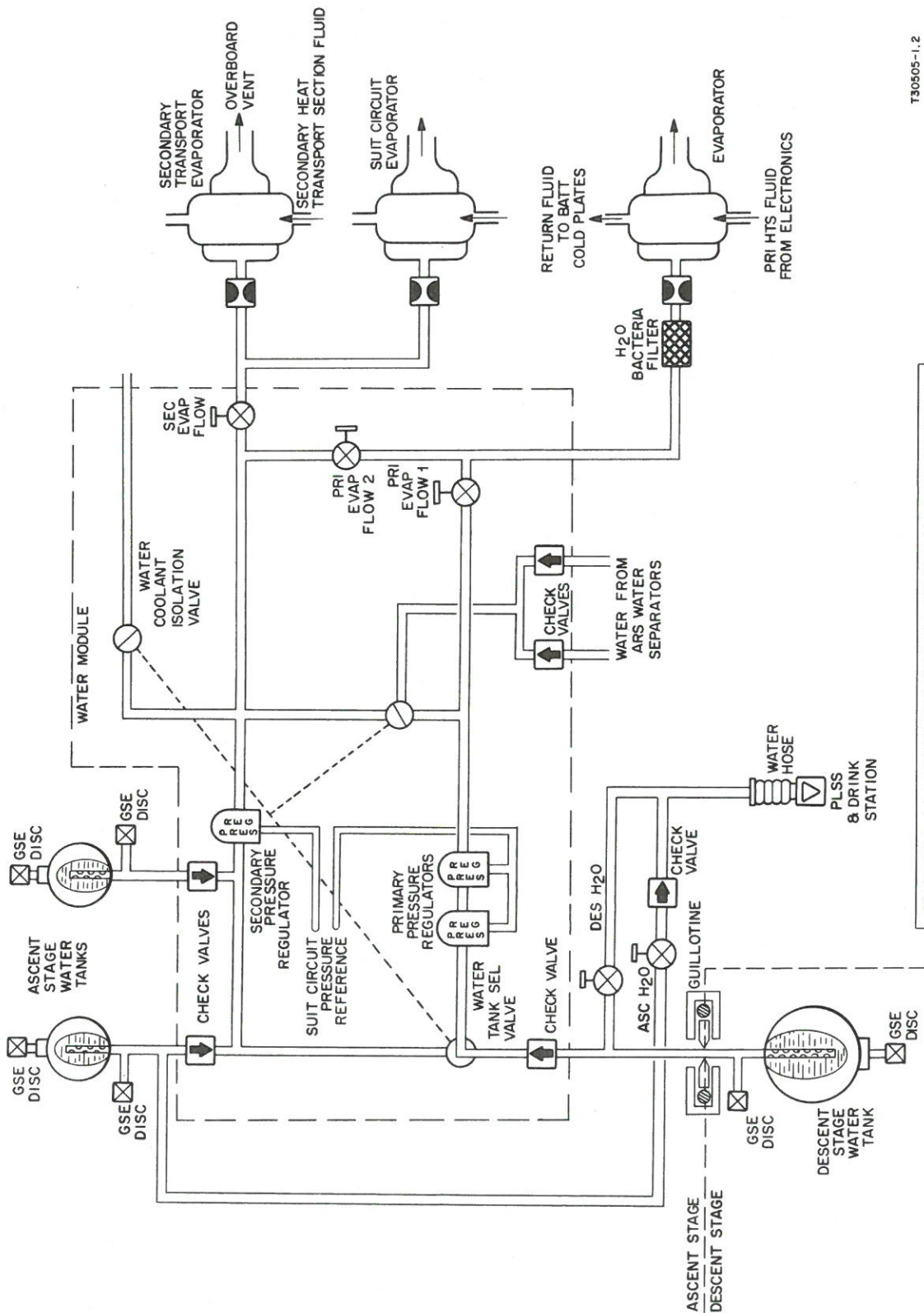
**OXYGEN SUPPLY AND CABIN PRESSURE
CONTROL SECTION SCHEMATIC**

T30005-158.1



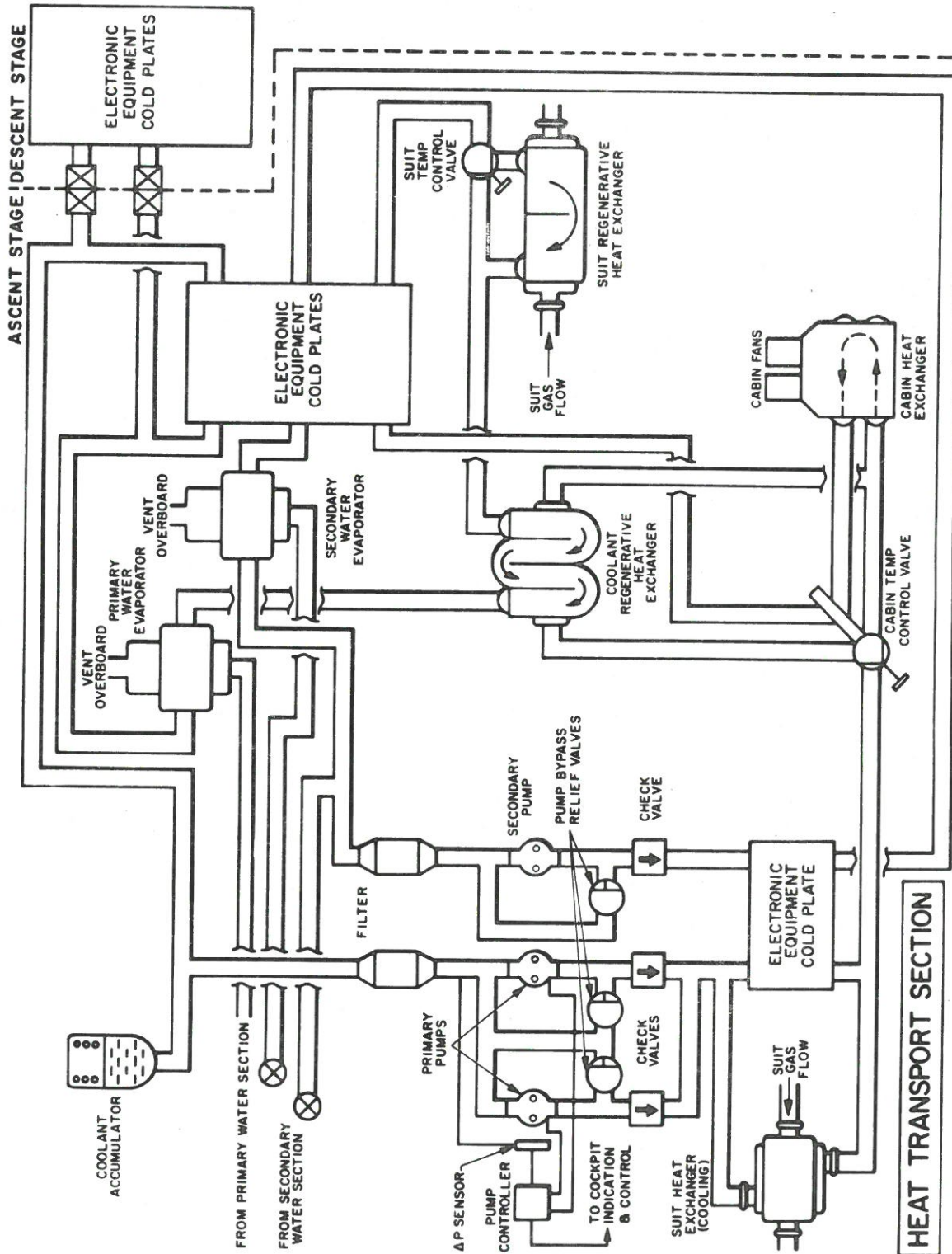
ATMOSPHERE REVITALIZATION SECTION SCHEMATIC

T30505-2.2

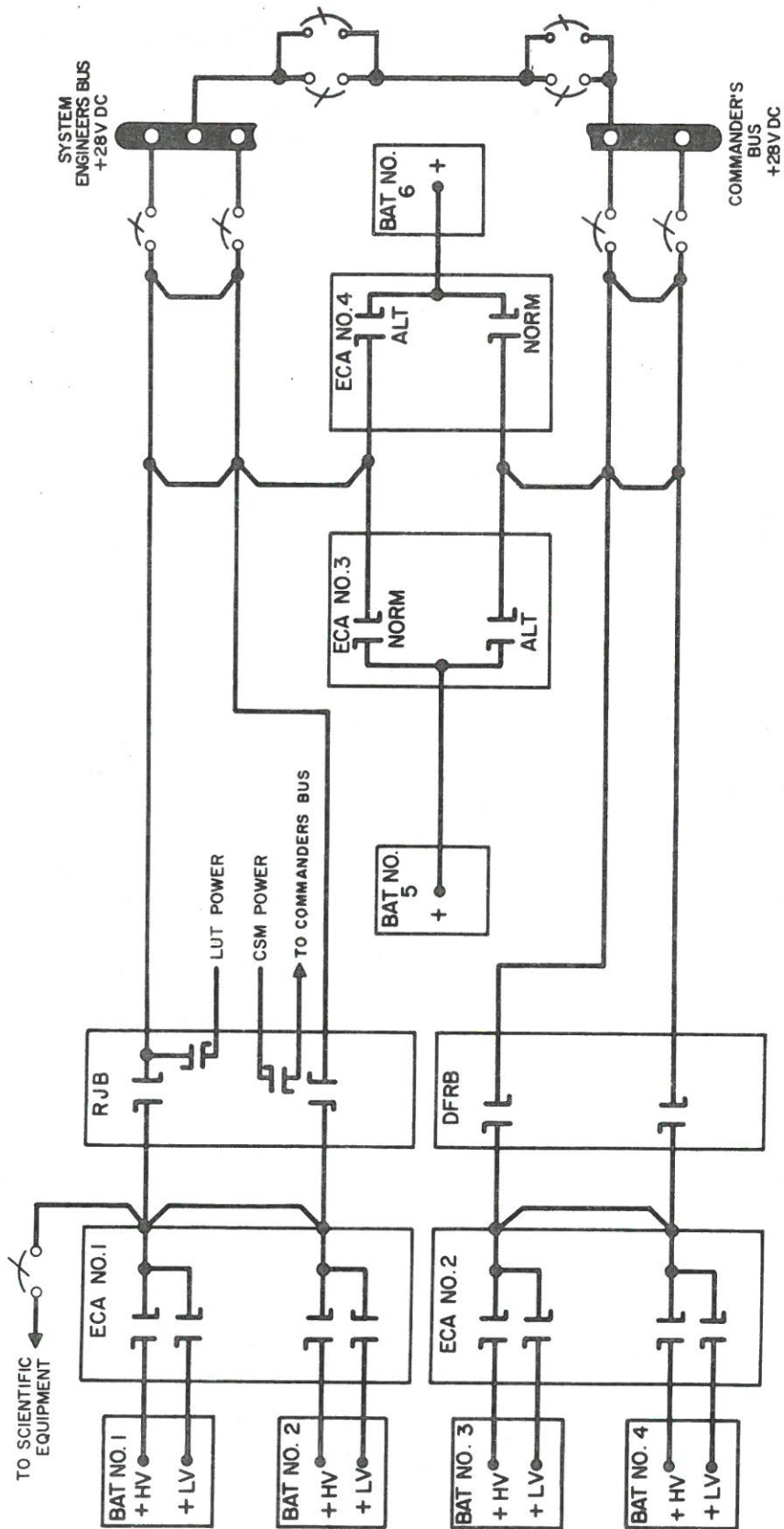


T30505-1, 2

WATER MANAGEMENT SECTION SCHEMATIC

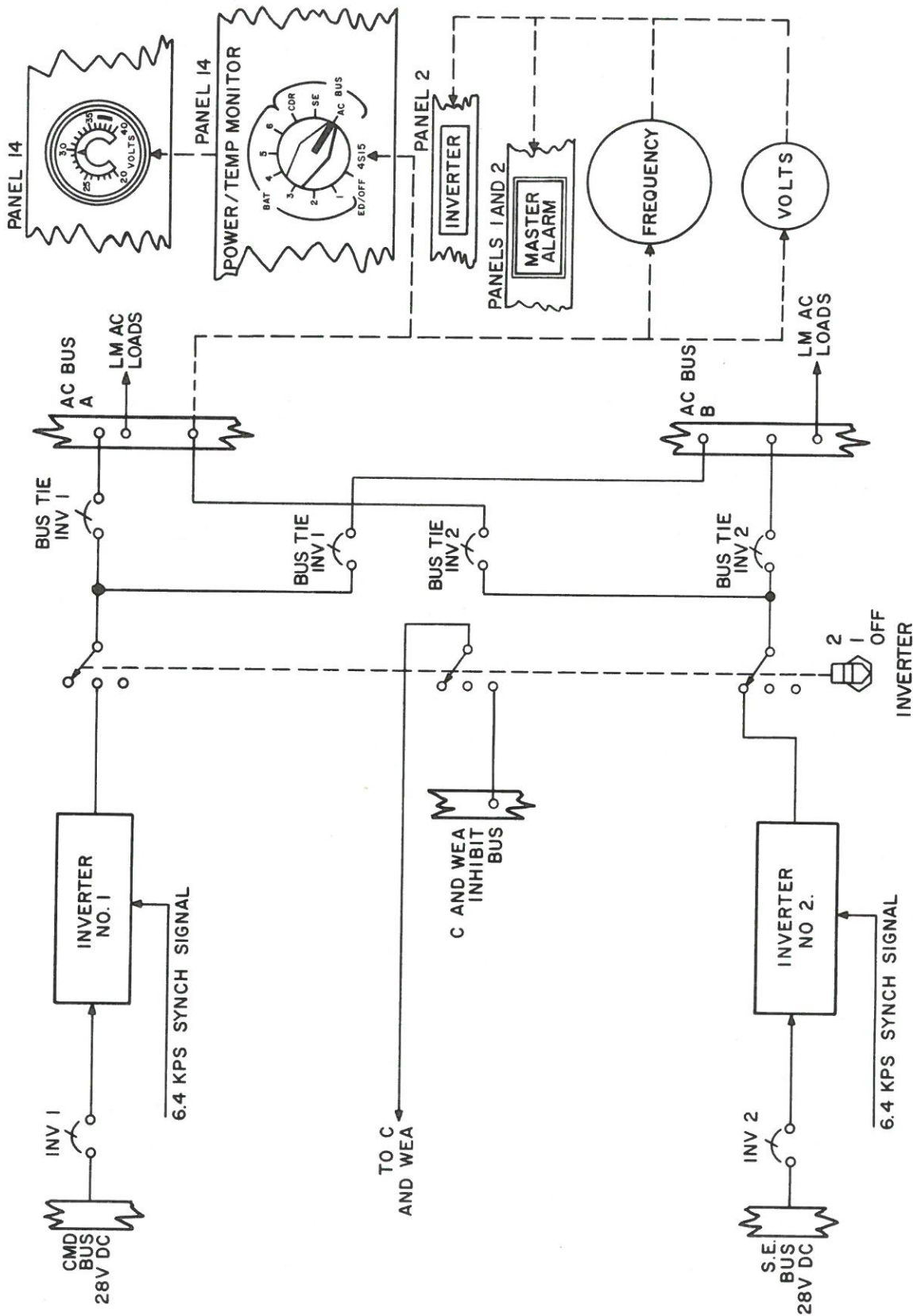


T30005-159.1



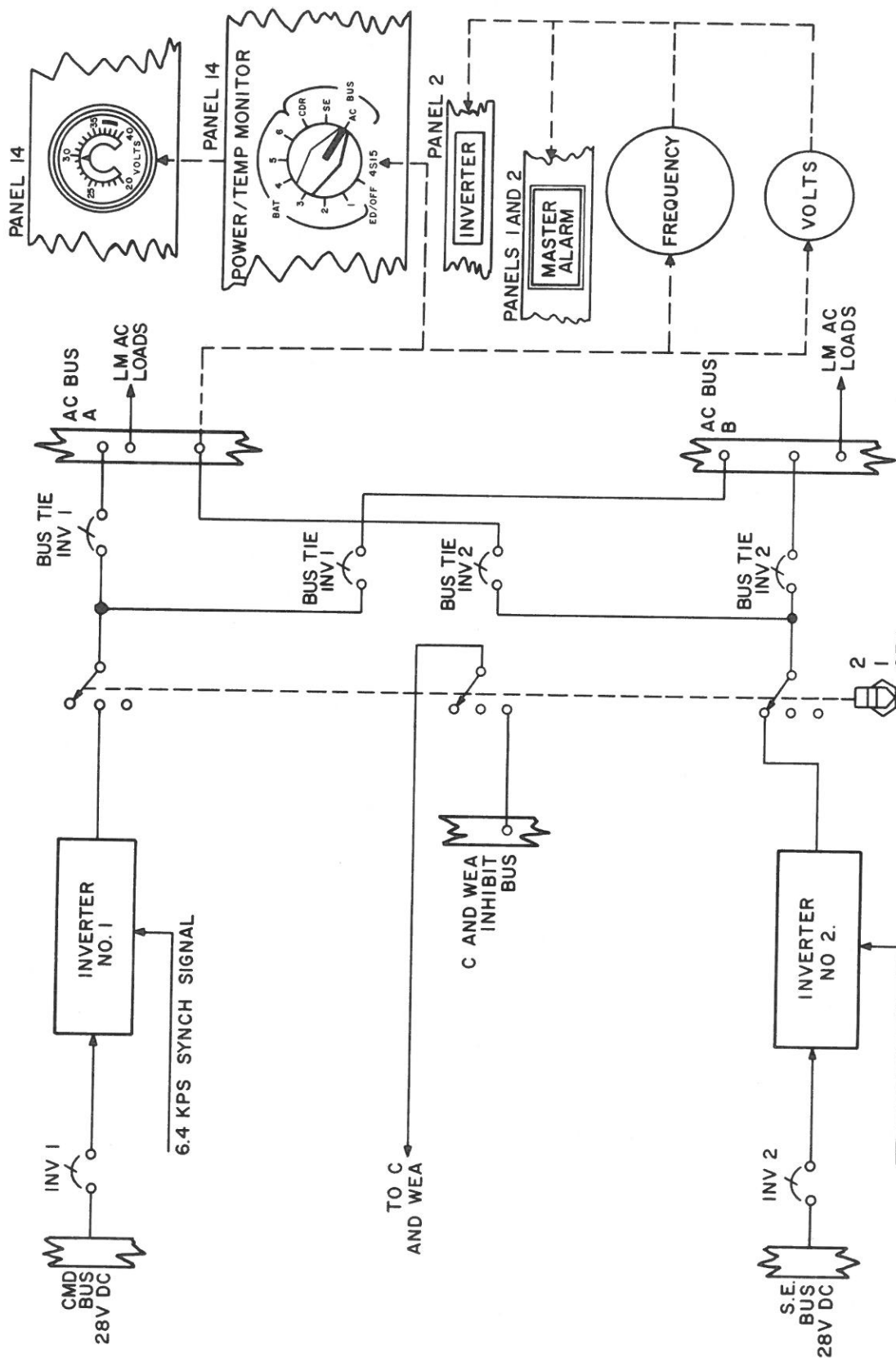
EPS FEEDER SYSTEM

T30005-126.1



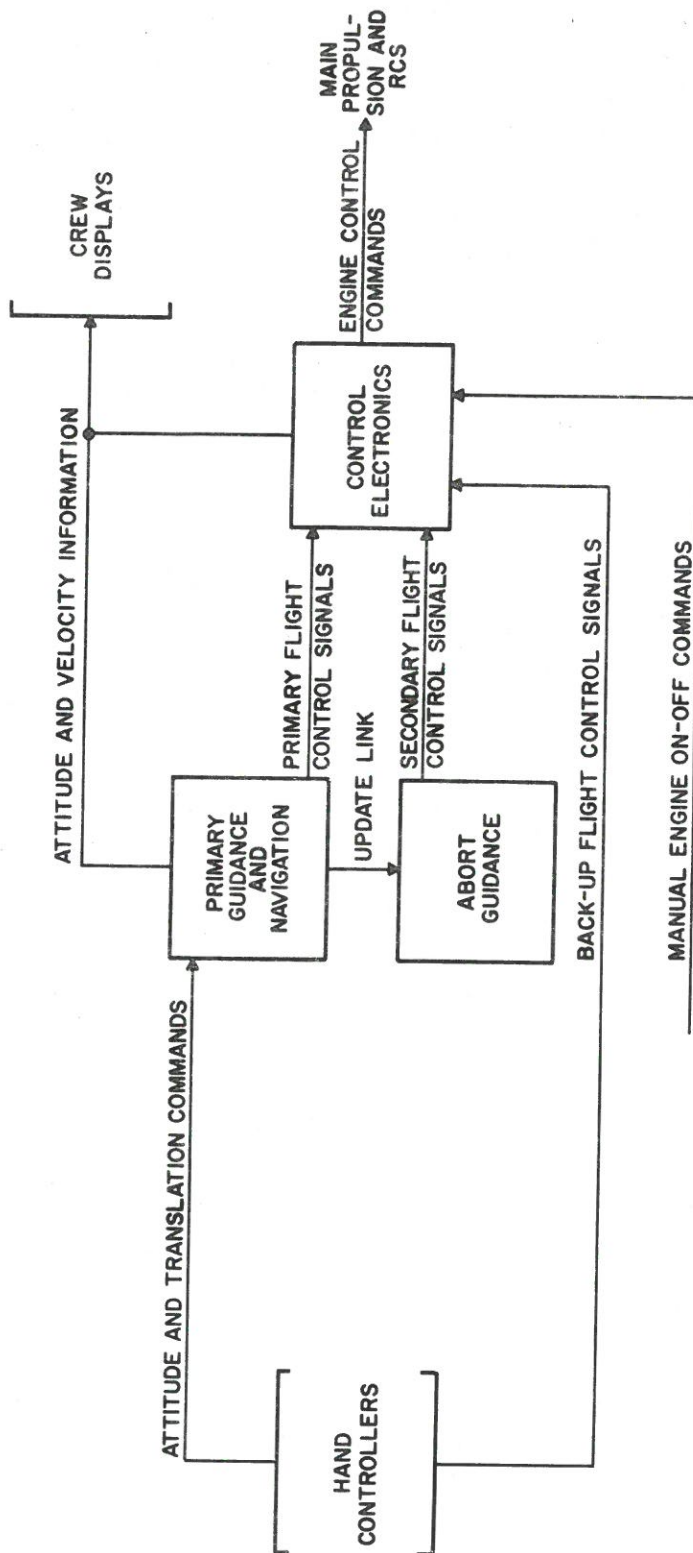
AC POWER DISTRIBUTION TELEMETRY
LM 3 & SUB

T30100-27.1



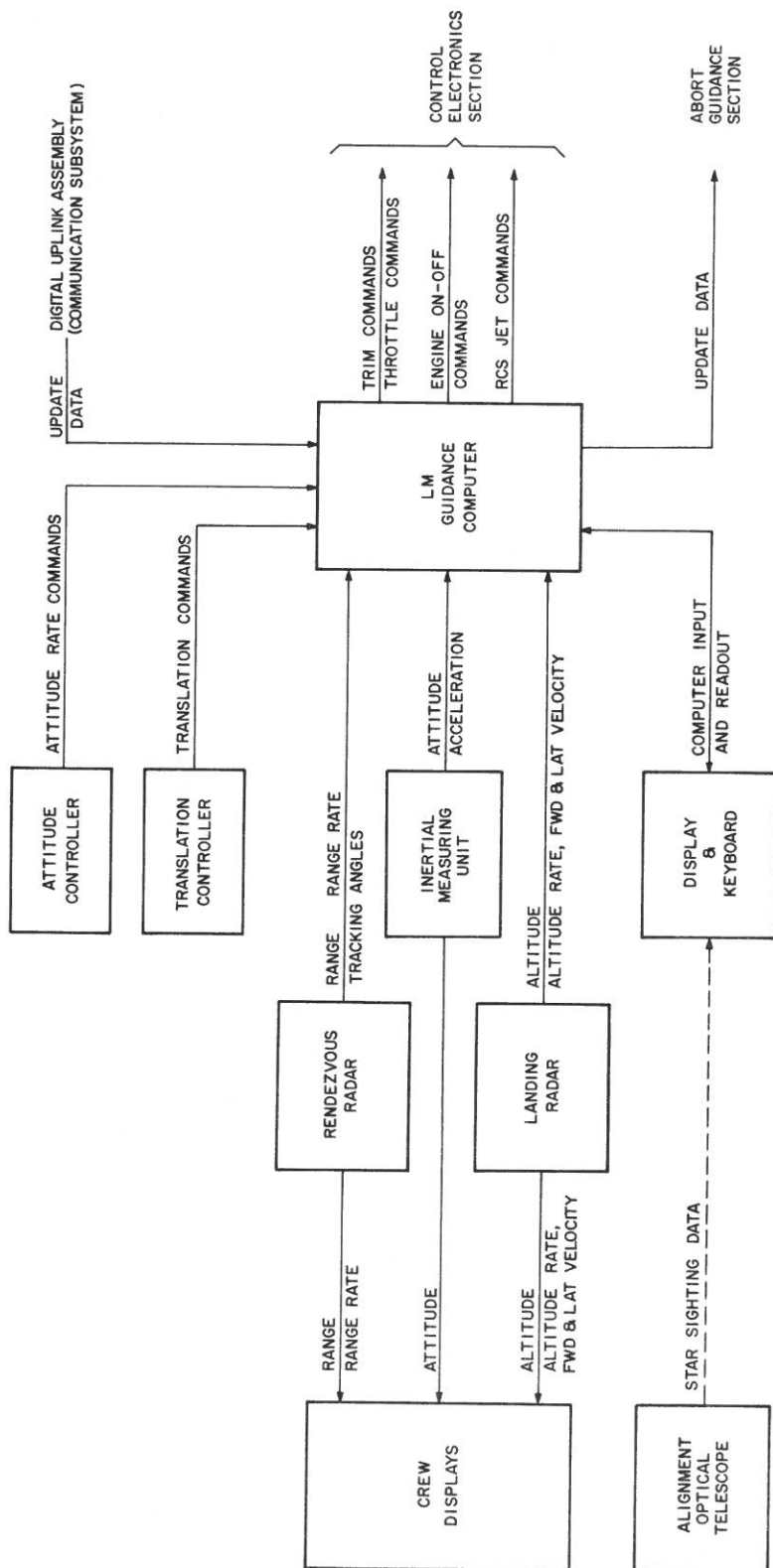
AC POWER DISTRIBUTION TELEMETRY
LM 3 & SUB

T30100-27.1



**LM GUIDANCE, NAVIGATION
AND CONTROL SUBSYSTEM**

T30005-44.1

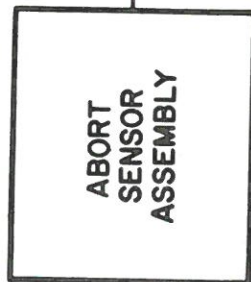


PRIMARY GUIDANCE AND NAVIGATION SECTION

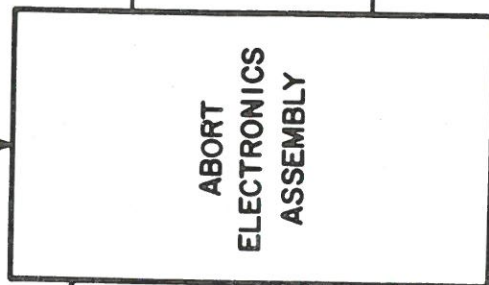
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GUIDANCE &
NAVIGATION
SECTION

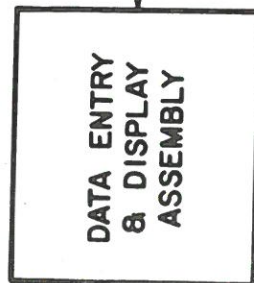
UPDATE DATA



GYRO DATA
ACCELERATION



ATTITUDE ERROR
SIGNALS



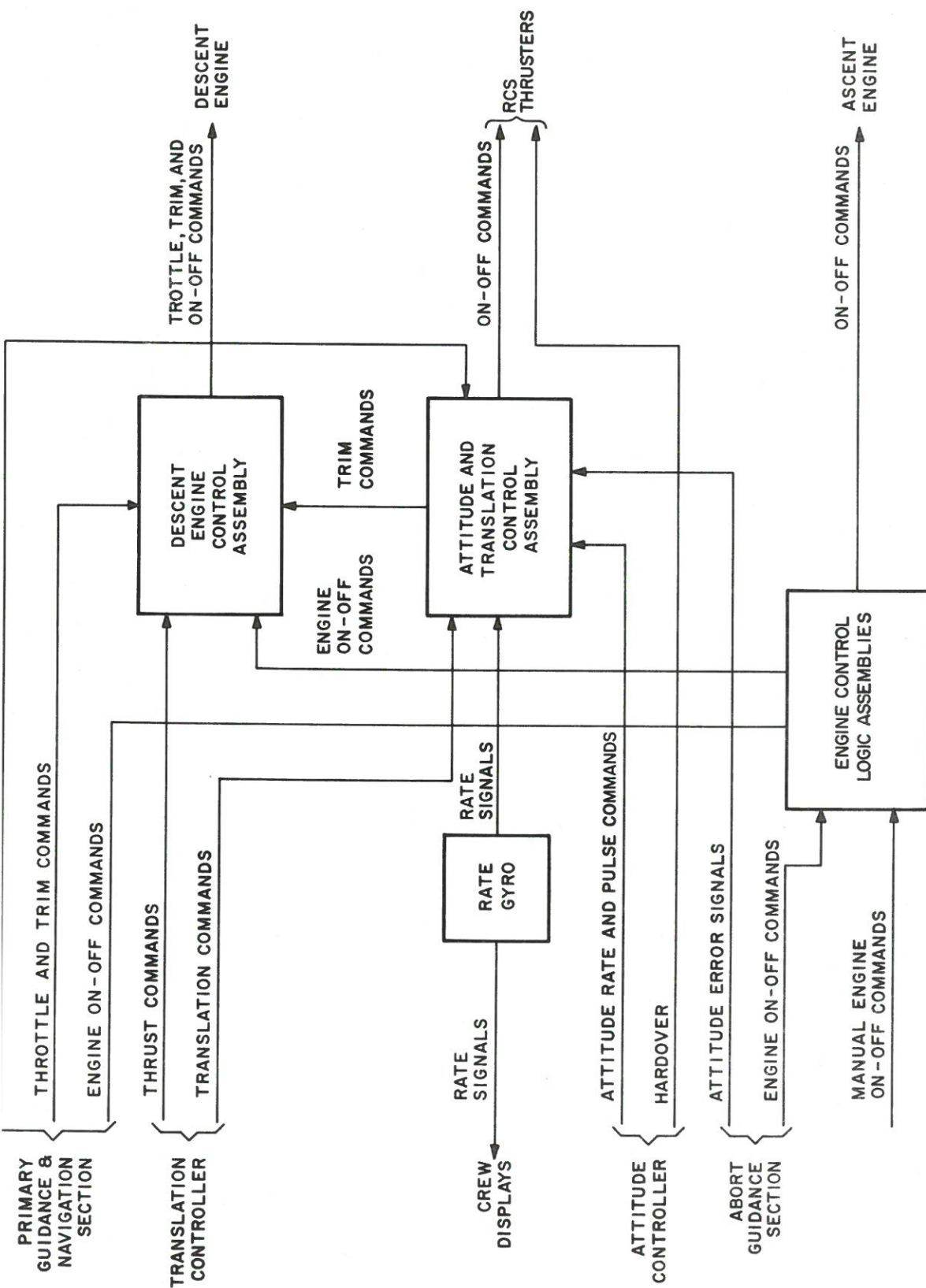
COMPUTER INPUT
& READOUT

ENGINE ON-OFF
COMMANDS

CONTROL
ELECTRONICS
SECTION

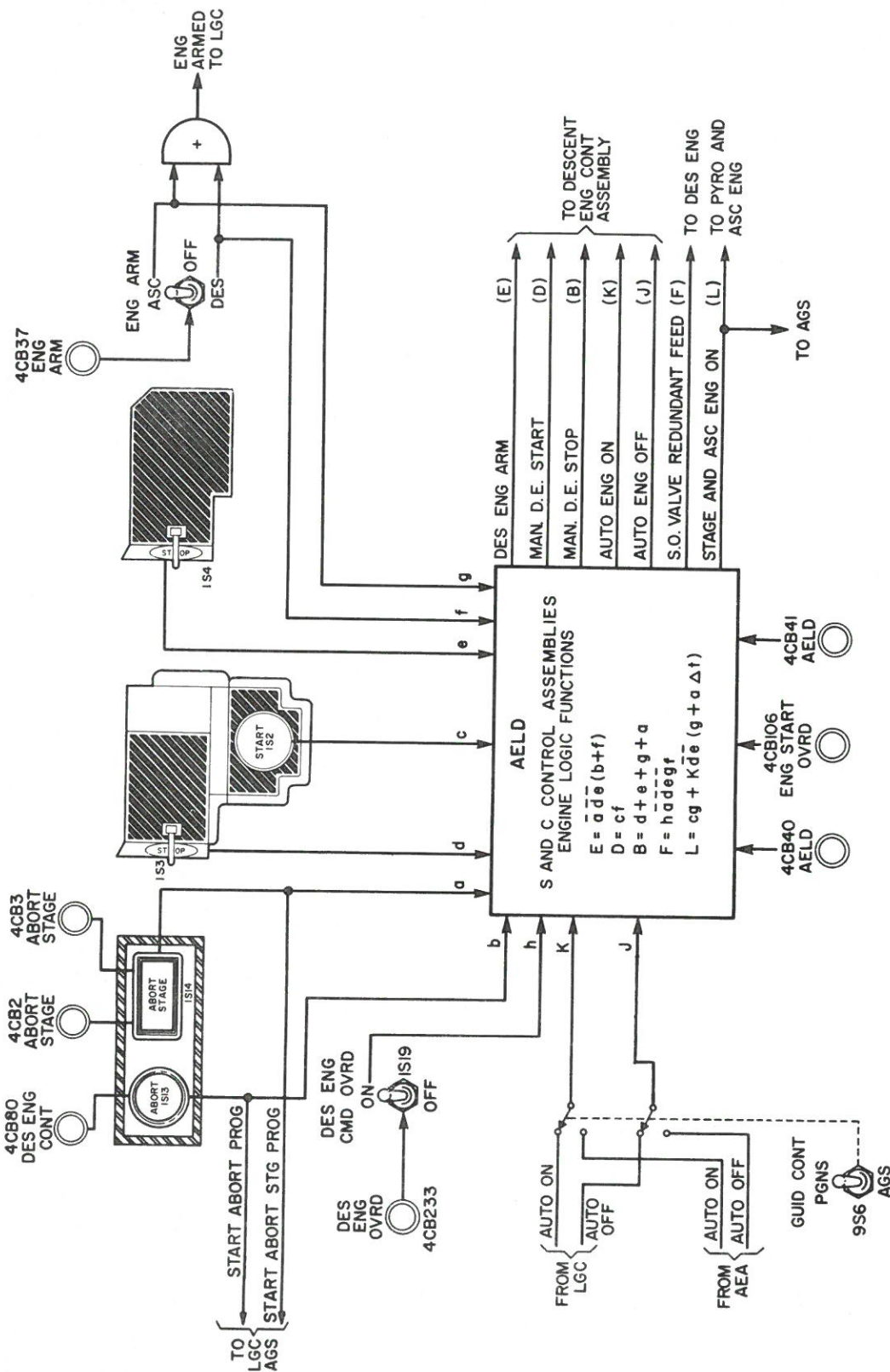
ABORT GUIDANCE SECTION

T30005-46.1



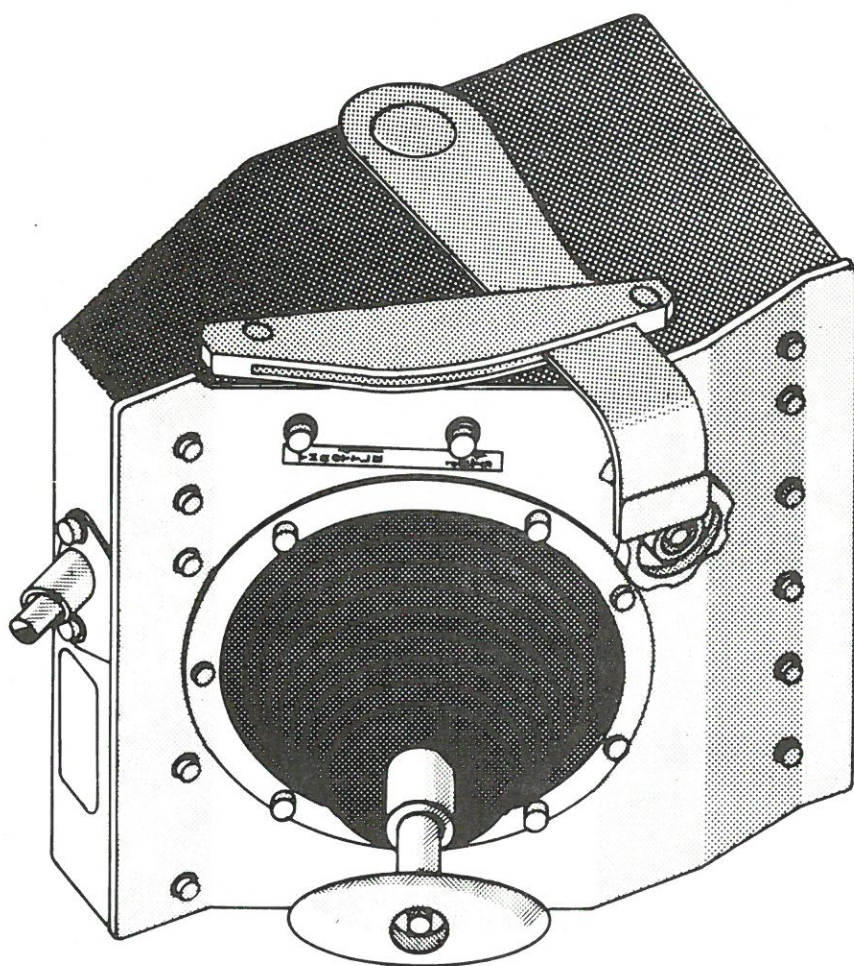
CONTROL ELECTRONICS SECTION

T30005-47.2

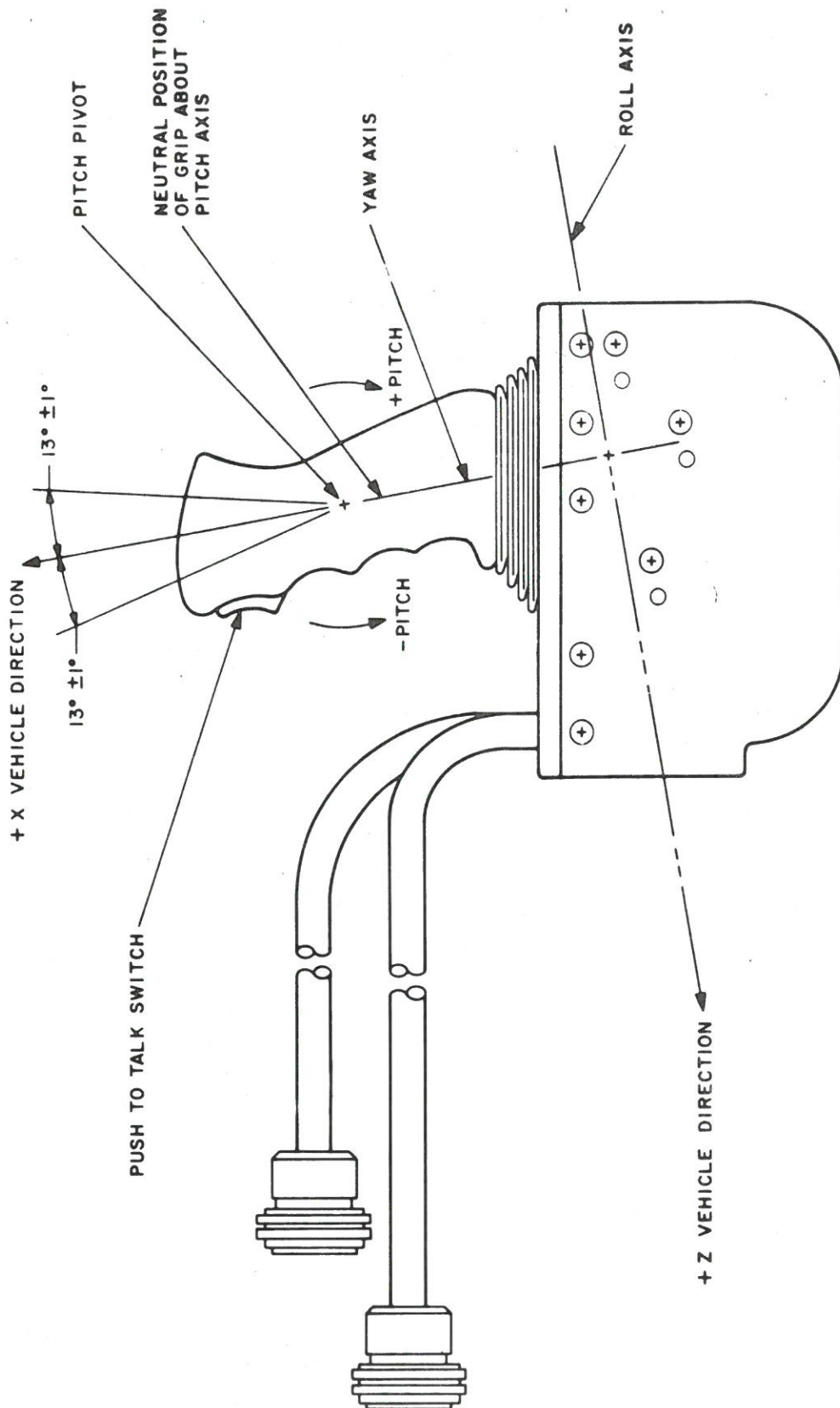


S AND C CONTROL ASSEMBLIES ENGINE LOGIC

T30312-50.1

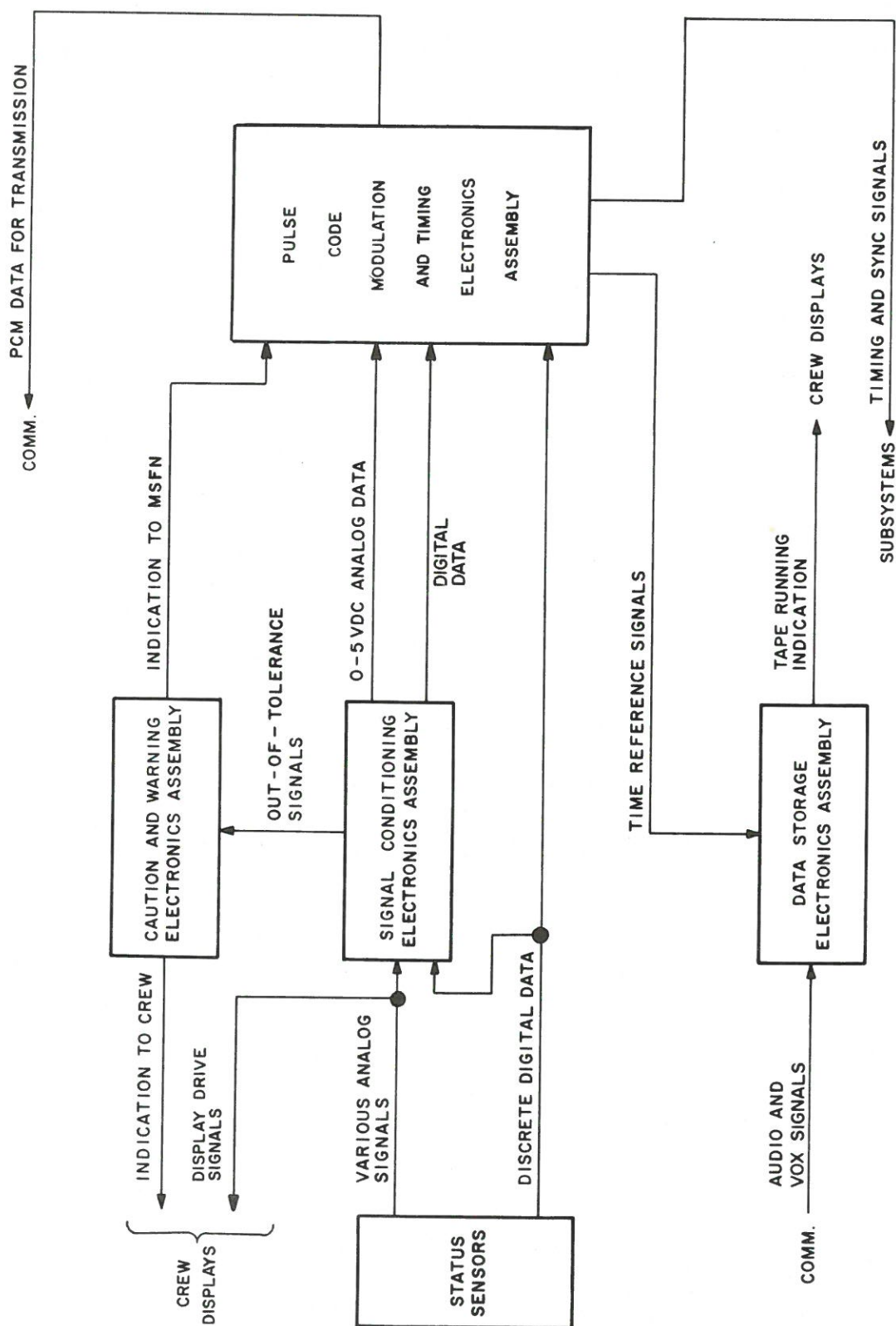


THRUST TRANSLATION CONTROLLER ASSEMBLY



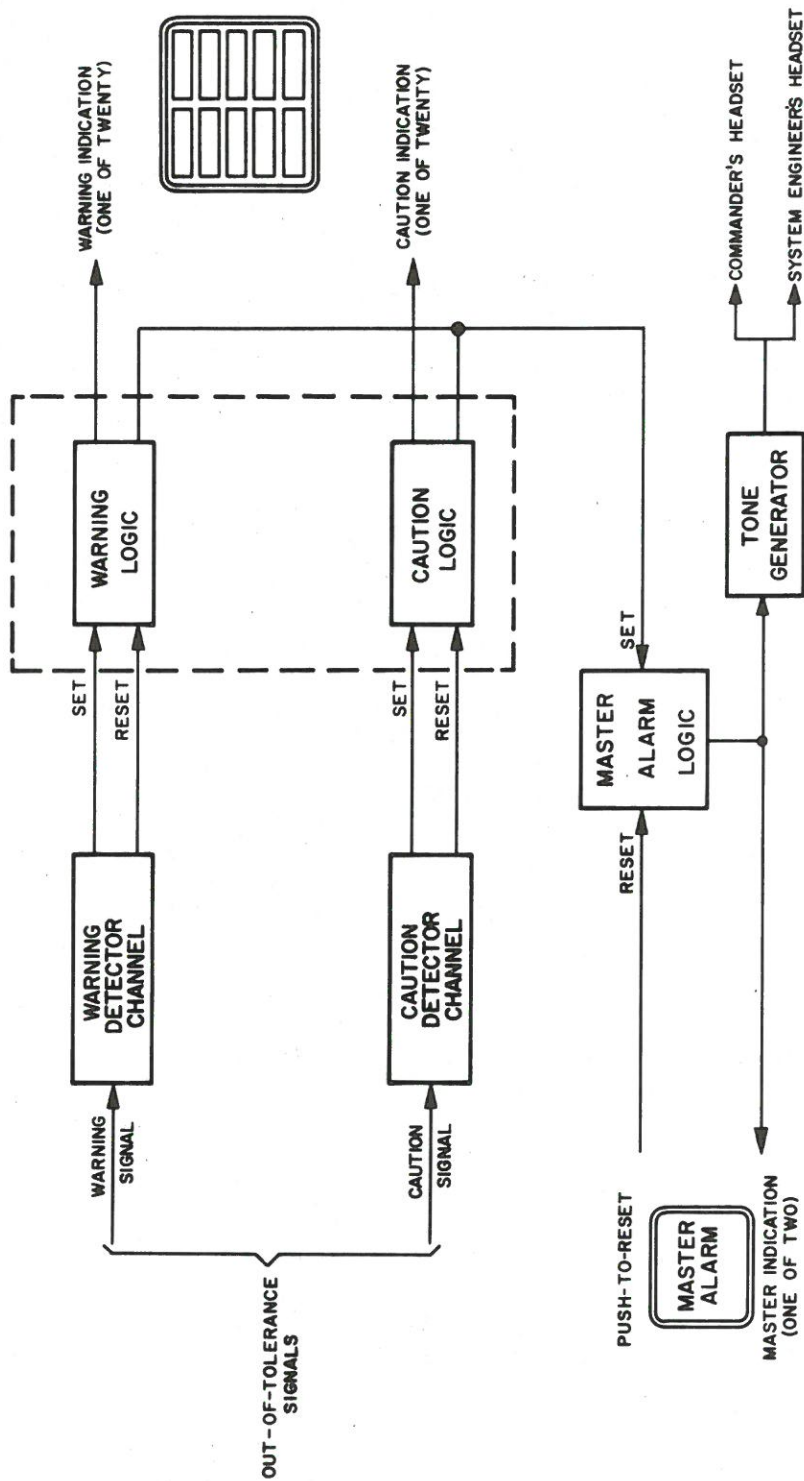
ACA MANIPULATION

T30005-52.1



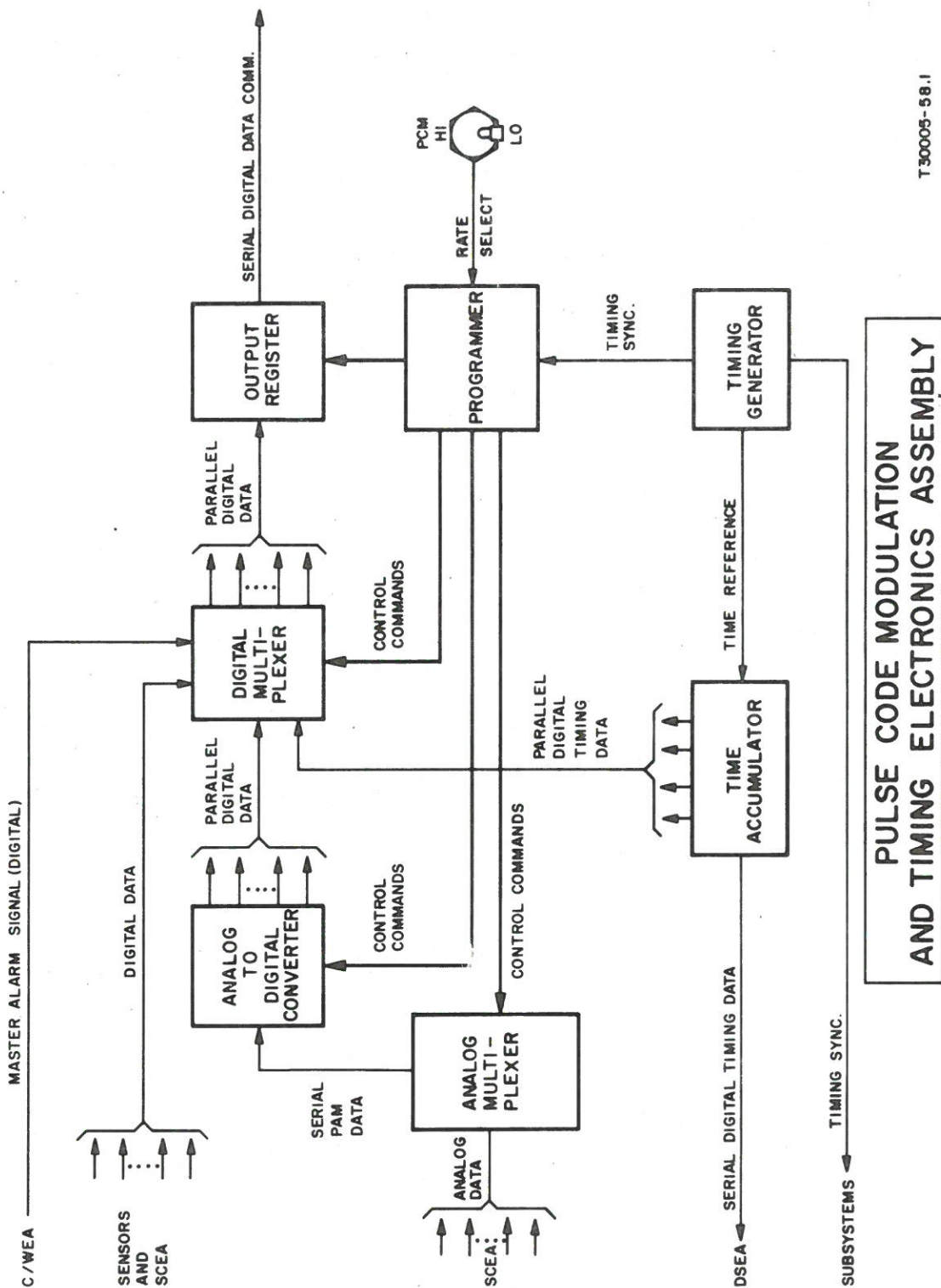
LM INSTRUMENTATION SUBSYSTEM

T30005-57.2



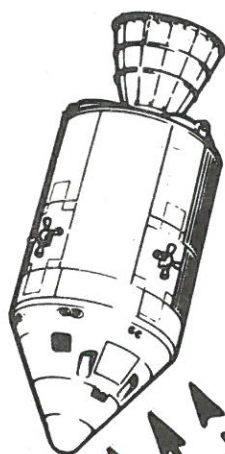
CAUTION AND WARNING ELECTRONICS ASSEMBLY

T30005-48.1



T 30005-58.1

PULSE CODE MODULATION AND TIMING ELECTRONICS ASSEMBLY



296.8 MC-VOICE
259.7 MC-VOICE
259.7 MC-DATA

VHF OPERATIONAL MODES

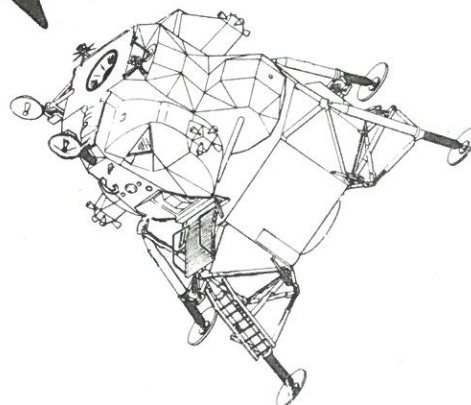
SIMPLEX - TRANSMIT VHF A 296.8 mc
RECEIVE VHF A 296.8 mc

or TRANSMIT VHF B 259.7 mc
RECEIVE VHF B 259.7 mc

DUPLEX - TRANSMIT VHF A 296.8 mc
RECEIVE VHF B 259.7 mc

or TRANSMIT VHF B 259.7 mc
RECEIVE VHF A 296.8 mc

DATA - TRANSMIT VHF B 259.7 mc



NOTE: DATA AND VOICE TRANSMISSION OR RECEPTION NOT
CAPABLE OF SIMULTANEOUS OPERATION ON VHF B

LM-CSM COMMUNICATIONS CAPABILITY

T30005-115.1



S-BAND DUPLEX OPERATION

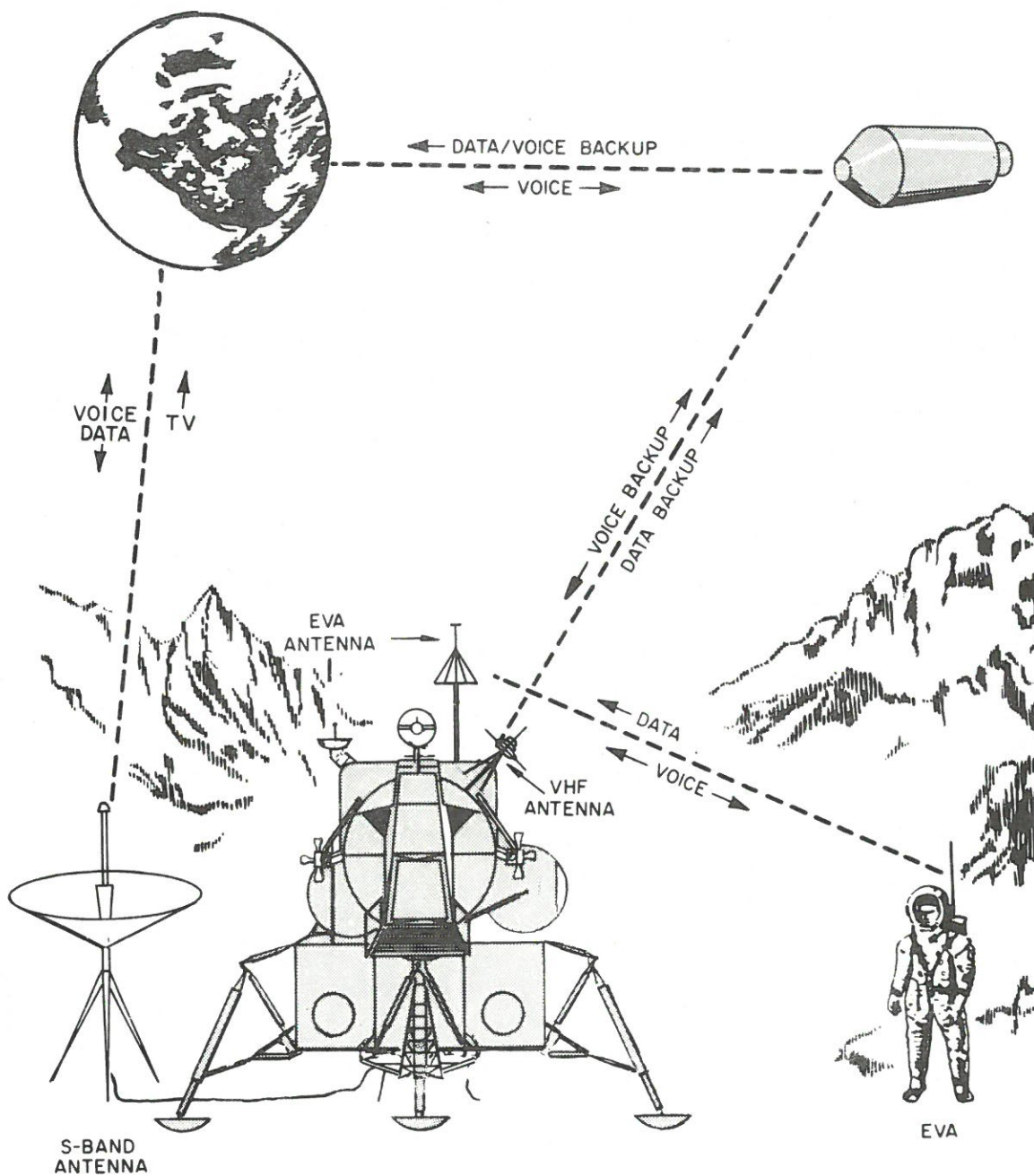
UPLINK 2101.8 mc ----- VOICE ON 30-kc SUBCARRIER
 -PRN RANGING CODE
 - DATA OR VOICE ON 70-kc SUBCARRIER

DOWNLINK 2282.5 mc ----- PRN RANGING CODE *

- PCM NRZ DATA ON 1.024 mc SUBCARRIER
 - HI BIT RATE - 51,200 BITS/SEC
 - or LO BIT RATE - 1,600 BITS/SEC
- VOICE ON 1.25 mc SUBCARRIER or
DIRECTLY ON CARRIER *
- EKG ON 1.25 mc SUBCARRIER or
DIRECTLY ON CARRIER *
- EMU DATA ON 1.25 mc SUBCARRIER or
DIRECTLY ON CARRIER *
- TELEVISION (FM ONLY)
- EMERGENCY KEY *

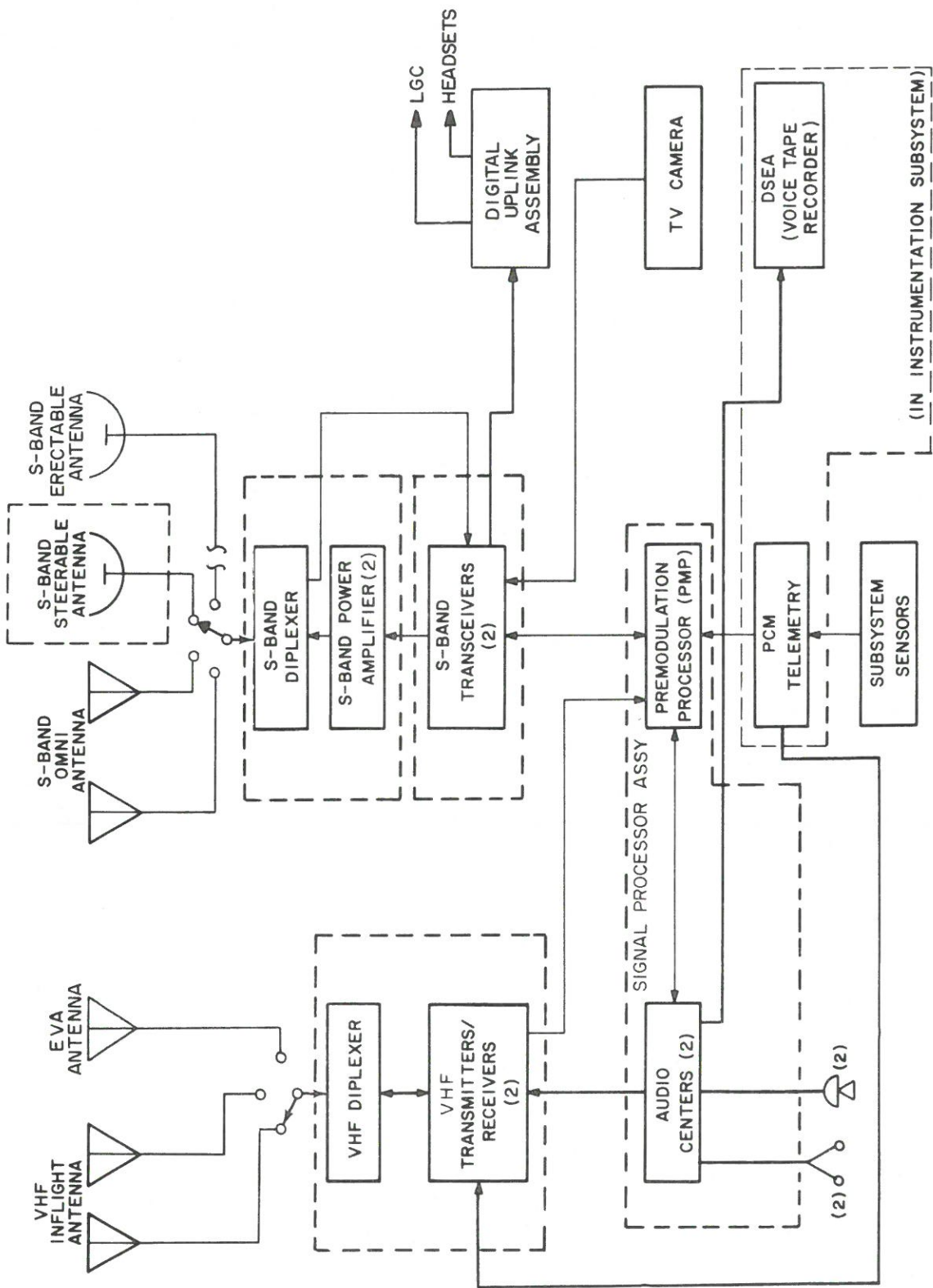
* - NOTES PM MODE OF OPERATION ONLY

LM- MSFN COMMUNICATIONS CAPABILITY



LUNAR SURFACE COMMUNICATIONS CAPABILITY

T30005-40.1



LM COMMUNICATIONS SUBSYSTEM

T30715-84.2